Telephony.

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A PROVERB.

He who knows not, and knows not that he knows not, is a fool; shun him.

He who knows not, and knows that he knows not, is simple, teach him.

He who knows, and knows not that he knows, is asleep; wake him.

He who knows, and knows that he knows, is a wise man; follow him. —Arabian Proverb.

Some Valuable Convention Papers.

At the two technical sessions of the convention of the National Independent Telephone Association, last week. there were a number of valuable papers read and talks given which are well worth reading, even by those who heard them. TELEPHONY proposes to reproduce these in this and forthcoming issues, together with many of the illustrations which were thrown on the screen by the stereopticon. One paper, which is the leading article in this issue, had to do with the production of dry batteries. Others will follow soon.

The Rise of the Motor Truck.

The men engaged in the telephone industry are of necessity men of ability and brains; otherwise they would not be in it. It should not be surprising, therefore, that they have so readily adopted, one after another, as they have been developed, so many inventions which make for efficiency and economy.

Among those which are particularly notable in this connection is the motor vehicle. Almost from the time the motor vehicle became commercial, telephone men took it up, in one form or another, and adapted it to their needs, generally finding it, even in the early stages, effecting economy of both time and money.

Today we find manufacturers, fully cognizant of this condition, building automobiles specially designed for telephone purposes, putting a particular winch on a truck or a peculiar arrangement for the troubleman on a motorcycle. Their advertising, also, is framed these days to appeal to the telephone manager, as a large and desirable buyer of their products.

True, the use of motor vehicles in the telephone business has hardly been of long enough duration, in most instances, to admit of exact comparisons with other means of locomotion, but it has been continued sufficiently long to convince most men, even if only in a general way, that motor vehicles are a distinct advance over those which are horse propelled. And this fact is so generally recognized that an increasing number is being sold to telephone companies every year.

Telephone managers who have not yet investigated the merits of this question would do well to obtain reliable data and check it carefully over. It may result in a considerable saving of real money.

Making Promises You Can Keep.

If ever a subscriber is entitled to courteous treatment it is when he has a just complaint to make.

It is the time also when the one receiving and answering the complaint must show the most tact and yet must tell the truth.

Some of these complaints are pressed with an insistence that often exasperates the one trying to smooth away the difficulties until he makes almost any kind of a promise rather than argue longer.

Yet it is such promises, made sometimes with full knowledge that they can not possibly be kept, that lead not merely to losing a subscriber's good will, but his contract as well.

Explain the situation if possible, tell the subscriber the truth, promise only what you know can be accomplished, and he will have to give you credit for these virtues even if disappointed by unavoidable delays.

The Failure

By HERBERT KAUFMAN

When the bookkeeper reaches the office he finds him puzzling through the mail and scheming out his coming nine hours of routine. He hasn't had a month's vacation since he slipped in harness. He takes a scant half hour for luncheon—even at fifty years of age he hasn't earned the right to a leisurely mid-day cigar. His daily path runs in a straight line from his desk to his bed.

He's a slave, shackled to the most worthless ambition that ever dulled a soul.

The pace—the monotonous, unvarying schedule—the grinding, binding, blinding self-drive—the steady trudging onward under the lash of his own will, have so worn him and torn him that his nerves are peeping through their threadbare coats—by day, spoiling his temper and his digestion; by night, squirming and twisting at his peace as he begs them for relaxation of calm sleep.

Life has cheated him by teaching him to cheat himself. The fruits of success have never been sweet upon his lips—he has only tasted the bitter rind.

His mind is channeled and all his thoughts run in one deep groove. The only book he knows is his ledger. He has never permitted Ruskin to carry him along the canals of Venice and re-weave the tapestry of the Renaissance. Nor under the magic spell of "Idylls of the King" has he seated himself in the lists of chivalry where Sir Lancelot would gladly joust for his pleasure.

Michelangelo and Titian have wrought in their fine frenzy of genius, but his eyes have never known the glories of their master craft. The Alps have poked their frosted old noses into the clouds—Lugano has purled and sobbed against her rocks—the sun has painted purple the white walls of Tangier every day since he possessed the key to his liberty, but the chains have never dropped from his ankles long enough for him to paint their majesty upon the canvas of his memory.

He is the most abject failure that ever succeeded in life.

And yet you have envied him and wished to stand in his stead. You have paused before his marble cell and cursed the fortune which denied you the right to have what he possesses—his worthless hoard of unspent and unspendable money.

He can buy a thousand shares of Steel as readily as you can purchase a crimson cravat—he can own the site of a city as easily as you can take title to your allotted six feet of peace—earth. But with all of his wealth, he can't buy what you possess—youth, and the opportunity to turn existence into life.

Fate is old and wise and cunning—and cruel. Every time she thinks of him she grins. Every time she looks at him she winks. She has made him overpay. She has sold at the price of gold and loaded him down with riches which at his possession have changed from preciousness into uselessness.

Now it's too late. He's too old to know. All the mystery and the charm and the marvel of things—all the poetry and beauty and wonder of his days are gone. He ran by them too fast to read—only the last chapters are before him—he can't turn back the pages of Life. For thirty years he planned "tomorrow"—the only thing in the world that never arrives. At twenty he could have found joy, at thirty enjoyment, at forty amusement, but at fifty he can't play.

He has deadened every sense except that of acquisition, and wealth unused is merely poverty.

The next time you pass his home, think it over—the laugh is on him—you're the rich man.

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Details of Manufacturing and Testing of Dry Batteries

Abstract of an Illustrated Talk Given at a Technical Session of the Recent National Independent Telephone Association in Chicago—Description of the Various Processes Which Enter Into the Making of a Dry Cell

By M. H. Moffett, Assistant Sales Manager, National Carbon Co.

About 30 years ago the first dry battery was introduced into this country, the product of Dr. Gafner abroad. At that time it was a low current cell and short-lived, but the advantages were so plainly evident that it made a great hit immediately it was introduced. Since then the manufacturers of dry cells in this country have made a great many improvements, but those improvements have not been due to any great or wonderful secrets or any wonderful discoveries in the chemical line. They have been due entirely to care and attention to the little details in the manufacture. I think it is true of any manufacturing line, that the concerns which standardize their products and forge to the front, are those concerns which spend time and money in the little details that all make toward a high-grade product.

The dry battery industry today stands as one of the great electrical industries in this country. There are more cells used in the United States, so nearly as we can determine, than in all other civilized countries combined. One of the great uses of dry cells has been in the Independent telephone field. The dry cell of today is a thoroughly reliable and efficient producer of energy for the telephone. It is one of the little details of telephony which makes for good service and an increase in your business.

The dry cell is simply a modification of the old wet cell. The old wet cell consisted of a carbon in some shape, a zinc, and a solution or electrolyte. Those conditions exist just the same in the dry cell. We have the zinc containing can, which is also the zinc element of the cell. In the center, usually, is placed a carbon pencil or carbon electrode, as the collector of current. Packed in between the zinc can and the carbon electrode, is the mix containing the exciting solution or electrolyte.

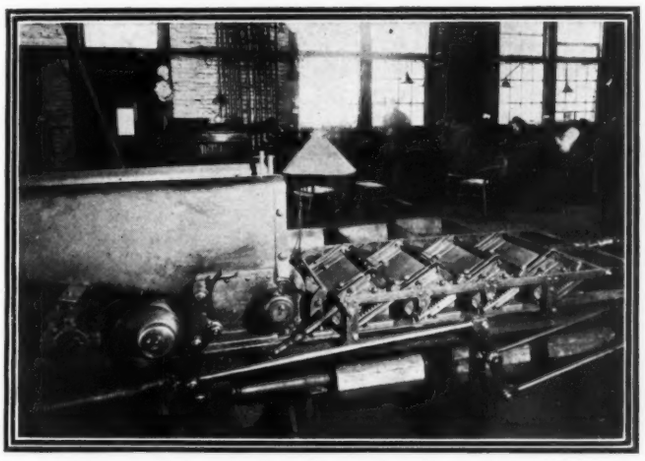
The first step in the makeup of the dry cell, in a general way, is the testing of the raw materials. The leading manufacturers of dry cells purchase their raw materials, their

Burr Stones Pulverize the Coke or Carbon.

chemicals, zinc, etc., under very rigid specifications far more rigid perhaps than you might think.

The zinc must be free from iron. It must contain only a trace of lead or cadmium. The manganese dioxide, which is used in the cell, is purchased under certain specifications as to physical qualities and chemical properties. The lining or septum in the cell which goes between the acid material and the zinc can, is also made under specifications as to texture and porosity.

Upon receipt of the raw materials, they are tested and if the specifications are fulfilled, they go into the makeup



Defective Carbons are Detected by the Sorting Machine.

of the cell. That is the first step and one of the important small steps and little details that make up dry cells.

The first step in the making up of a dry cell is the production of the carbon element. The first process is the production of the pitch used in the manufacture of carbon. The base of carbon is retort coke, which is the residue found in the flues of gas houses, or petroleum coke, which is the residue from petroleum stills. Tar which is mixed with the coke is distilled under steam heat. Pitch of the character desired for that work is separated from the other materials and is used as the binder in cementing together the carbon.

The coke as it is received is broken up into small particles which are put into a muffle furnace. In the muffle furnace all the volatile matter in the coke is driven off. The next step is to pulverize the carbon or coke and that is done in a standard type of burr mill, the same as used by wheat millers. The illustration shows a pair of the burr stones used in a mill.

The pulverized carbon, pitch and some other ingredients, are together placed in the cylinder mixer, as it is known. This is a double-walled drum, heated with steam, and inside are a number of revolving paddles, which thoroughly mix the ingredients. They are removed from the back end of this drum, and are then put into a typical bread mixer, the same as used by the large bakers. These mixers are also steam-jacketed. For a certain length of time, the mix is turned around in this mixer so that it produces a thorough mechanical mix of the materials going in the carbon.

The mix is taken from the mixer to some steam-heated rolls. It is passed through these rolls and rolled out into a thin flux, about $\frac{1}{32}$ in. or $\frac{1}{16}$ in. in thickness and varying in size from that of a thumb nail up to the size of the hand.

Leaving these rolls the carbon mixture is carried to a cooling floor, where it is allowed to cool. From the cooling

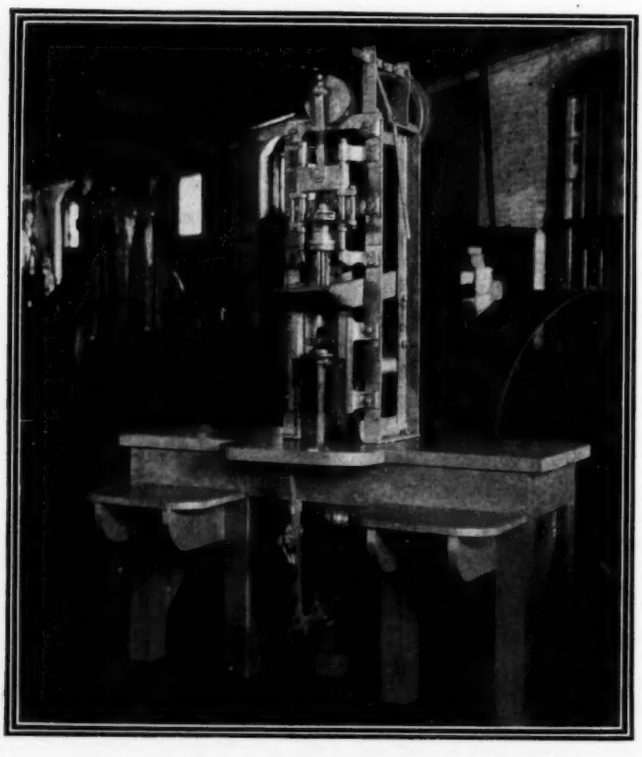
floor, the plates are taken to a disintegrating mill. This mill has in it two disks of hard steel, with pockets cast in it, revolving in opposite directions at about 4,000 revolutions per minute. The material is packed back and forth and pulverized to a very fine state. After this process, it is bolted through a bolting machine the same as is wheat flour and comes out a little finer than the average wheat flour. The material then is known technically as mix and is ready to be molded into shape by one of two different processes.

One of these is known as the forcing process, the first step of which is to mold the mix into cakes. The mixture is put into four-hole dies, shoved under a hydraulic press and subjected to about 600 tons pressure, forming a cake.

The cakes of carbon mix are then fed into the front end of the steam-jacketed cylinder of a forcing press, known in the factory as a "Jumbo." A ram is forced up against them by hydraulic pressure and the carbon is formed into long sticks which are run out on a cooling board. This material is quite flexible while it is hot, but becomes quite hard, although brittle, when cool. The sticks are made into lengths approximating the size that will be required and later go through the carbonizing process.

The other process is known as the molding process. Powdered mix is placed in steel molds carried upon a chain. The lower end of this chain passes through a heating furnace, where the molds are heated to a temperature which will unite the binder thoroughly with the carbon base. The material is then passed into the hydraulic press, the ram is raised and subjects it there to a pressure of approximately 600 tons. The material in this stage is very nearly an insulator. The next step is to carbonize or bake it.

The material is next packed into a ring furnace. The



Dry Cells are Filled Uniformly by Machinery.

different carbon particles in the green state are arranged so that no piece of carbon touches its neighbor. The furnace is then sealed with a fire clay to exclude air, because carbon will burn if air is permitted in the furnace. It is then subjected to a temperature of 2,400 to 2,800 deg. Fahr., for varying periods of from 8 to 14 days, depending upon the material, the size of the carbon pieces, and the character of work that it must perform after it is finished.

The next step is the smoothing up of the ends of the carbons which is done by a butting machine. The carbons are fed into a chain carrier, with recesses to carry them, and passed to carborundum wheels. These grind the ends smooth, bringing the carbons all to the same length. Another carborundum wheel, set below the center, puts a point on the carbon if it is desired.

After the ends are smoothed the carbons are sorted. In the carbonizing process, some of them warp and the sorting machine is designed to separate the sheep from the goats. It has a series of steel plates with a track inserted in them. This track is elevated a trifle above the surface of the plate and is insulated from it. There is a hooked carrier which comes down, picks up one carbon and rolls it up this track. You can readily understand that if the carbon is crooked it will touch the plate. If it does a circuit is closed, operating a magnetic trip which drops the shutter and the carbon is thrown into the outcast bin. The machines have four sorting plates on them, so that four grades of sorting can be taken out.

The first step in the actual building of a dry cell is the rolling of sheet zinc into a cylindrical form. It then goes to the side seaming machine, which is a machine with revolving mandrels. The can is slipped into one of these mandrels. Then the automatic process picks it up and passes it around to a point where a gas-heated soldering iron drops down. At the same time, solder is fed against the soldering iron which is worked back and forth to simulate the human effort in soldering, until the seam is soldered. Then it passes around to a point where a couple of grab claws take the can or cylinder off and drop it in a chute, where it is carried off on a belt conveyor. The can bottom is of an upset biscuit shape. The cans with the bottoms in them are fed into a machine which automatically seals and solders them together. First, they go through a bath of flux or soldering acid, next through a bath of solder and then a bath of hot water to wash off any remaining acid, after which they are passed into the testing machine.

A leak, as you can readily understand, in a dry cell, would soon destroy it, in that it would moisten the paper jacket and the moisture would short circuit one or more of the cells in the circuit. Cans, clamped between two rubber disks, are fed into the testing. machine. The machine revolves and carries the can beneath the surface of a tank of water where five pounds of air pressure are applied to the inside of the can. Any leak in the can would show up in the shape of bubbles in the water. In such cases the operator pushes back a little trigger and the can is thrown out for resoldering.

After passing through the soldering machine, the cans are placed on trucks, open end up, and taken into the lining room where the pulp board or pulp paper lining is placed in them. The lining is first soaked with certain chemicals, varying with different makes of dry cells to some extent, but generally the same.

Leaving the lining room, the cans pass to the filling room. An illustration shows one of the machines in which the dry cells are filled with mix. The dry cell is placed on a standard and the carbon is held in the center of the tamping part. In action the carrier works up and down and at the same time tamping sticks, which are of hard wood, revolve. The loose mix as it is fed into the cell is forced down. There is a ram dropped down in the machine, on the back end of which—you can hardly see it in the picture—are weights, so that each cell is always filled against the same weight. This is one of the things that makes for uniformity. I might say in this connection that only a few dry battery makers use machine filling.

In filling cells by hand, the custom is to throw in a handful of mix, then take a ram and with a heavy hammer or mallet, beat it down into the cell and then repeat the operation when another handful is thrown in. You can appreciate readily that if one of the workmen has been to a wedding or a party the night before, he makes a different kind of cell than he did a few mornings back, or if he wakes up with a grouch, he makes grouchy cells. By eliminating the human element as far as possible, the manufacturers have taken a great step toward uniformity in dry cell production. Machines are also used in connection with soldering on the zinc terminal. The cells are laid on a slowly revolving table and the post is started on by hand.

During the manufacture of dry cells, from three to four tests are made for both voltage and current. As they pass from stage to stage in process of manufacture, they stand over night and in the morning are tested, first for voltage and secondly for amperage or current. By the time cells have been completed, they have received three tests.

The finishd product is stocked for four days. The reason for this is that a torn paper lining, the omission of the bottom lining in a can, or a cracked lining, would be productive of an internal short circuit, which is just as bad for the cell as an external short circuit. These conditions will develop within two or three hours, unless they are very slight. Therefore, it is deemed advisable to store the cells over night before making tests during manufacture. After they are finally completed, they are stored four days so that there will be no question but that any defects of that character will show up.

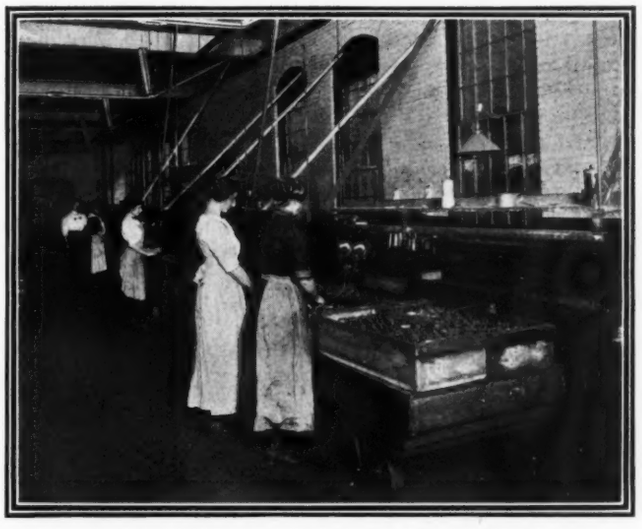
The final test is made immediately before the cells are boxed for shipment. They are brought in from the factory stock in trucks. They are turned over and one of the operators tests them for voltage and passes them on to the next to test for current. If they are up to the standard for that character and grade of cell, they are turned over to the packer.

In packing, trucks are used with a rack at the top which will contain just 125 cells, the number in a standard barrel. This truck is passed over to the packer, checked by an inspector and the cells placed in the barrel. After the cells are packed, checked and marked, they are weighed. A standard barrel of cells weighs approximately 300 pounds. A shortage of five cells would mean an actual weight shortage variation of from 10 to 12 pounds. The weighing is a further check of the correctness of the number in a barrel.

It is doubtful that very many consumers realize the expense to which the manufacturers of dry cells have gone in raising the character and quality of their goods. In our own case we have under test at all times from 55,000 to 88,000 cells, not only our own but those of other manufacturers. The device for testing cells consists, roughly, of two clocks as a factor of safety. If one clock stops, the other picks up the work. Should both clocks stop, which is not very likely to happen, alarm bells are immediately rung all over the factory. At the same time, a red incandescent lamp is lighted in each department, indicating that something has gone wrong with the testing device. The cells are tested by closing the circuit through resistance for certain periods of time or different lengths of time during the day or the week so as to simulate as closely as possible, actual practice. Readings are taken periodically of the voltage drop across the resistance to determine the condition of the cells.

Some telephone apparatus is used in testing. We have a bank of jacks and with it a voltmeter connected to a standard two-contact plug. By means of this arrangement any set of cells in the test room can be tested for voltage without walking all over the room or handling the cells, thus saving time and also wear upon the cells.

A mistake, frequently made by inspectors and men connecting up cells, is to connect them straight through so that the zinc binding post is adjacent to the neighboring cell. That is a mistake—a serious mistake—because if those cells are crowded together, the binding post of one cell will touch the zinc of its neighbor. Then one or more of the



Final Testing of Dry Cells Before Shipment.

cells in the series will be short circuited and you have trouble and make the usual complaint to the manufacturer about receiving poor cells.

There are a number of conditions in your own practice where you feel, and perhaps know, that the work is too severe to put on dry cells. A battery of dry cells, however, can be assembled which will do wonderfully good work, and that is by multipling a number of series. First establish the series that gives the required voltage and then put in enough sets in multiple to perform the work desired. In moderately heavy duty there is a big saving to be gained by studying the various combinations.

Annual A. I. E. E. Convention at Cooperstown, N. Y.

At the February meeting of the board of directors of the American Institute of Electrical Engineers it was unanimously voted to hold the annual convention in Cooperstown, N. Y., during the week beginning Monday, June 23, 1913.

The board authorized a two-day Institute meeting in Pittsburgh, Pa., during the latter part of April, under the auspices of the committee on the use of electricity in mines, in co-operation with the Pittsburgh section. The exact date of the meeting was left to the discretion of the meetings and papers committee, and will be announced later.

Claims Majority Prefer "Tick-Tick" Telephone.

City Electrician Ray Palmer, of Chicago, has submitted to the council committee on gas, oil and electric light his report on nickel-first telephones, showing that 66.66 per cent. of the users prefer them to the nickel-last type. Mr. Palmer received answers from 521 "tick-tick" subscribers, 347 of whom were in favor of the nickel first. Only four objected to this type. One hundred and twenty-seven subscribers gave no reason for preferring the older type. Five had no choice, five said the service was poor, ten complained of delay in returning the nickel and 11 mentioned other difficulties in obtaining the return of the nickel. At a meeting this week, however, violent protest was made by subscribers against the "tick-tick."

California Railroad Commission Orders Intercommunication

Full Text of Ruling Recently Handed Down, Which Compels Pacific (Bell) Telephone & Telegraph Co. to Interchange Service with Tehama County and Glenn County Independent Companies—One of Most Important Decisions Yet Made by Any Commission

[EDITOR'S NOTE: As briefly reported in this paper two weeks ago, the Railroad Commission, of California, has handed down a ruling requiring the Pacific (Bell) Telephone & Telegraph Co. to interchange business with two Independent telephone companies in that state—the Tehama County Telephone Co. and the Glenn County Telephone Co., which were the complainants, the Pacific Bell being the defendant. This ruling is so circumstantial and goes into the question in so broad and thorough a manner that it is here printed in full. It is undoubtedly one of the most important yet made by a public service commission.]

In these cases complainants ask for a physical connection between their telephone systems and the system of defendant. The complaints in these cases were filed on April 30, 1912, and are substantially in the same form in both cases.

The complaint in case No. 271 alleges in effect that complainant is a public utility owning and operating a telephone system in Tehama county, California, and having connected with its system in actual use and service 698 stations; that defendant is a public utility corporation doing a general telephone business in California and owning long distance toll lines throughout the state, one of its exchanges being situated in Red Bluff, Tehama county; that complainant has requested the defendant to establish a long distance connection between the exchanges of the parties at Red Bluff, but that defendant has refused to comply with the request; that the telephone lines of the parties can be made to form a continuous line of connection and that the physical connection between the exchanges of the parties can reasonably be made by the construction of a trunk line between the exchanges of the parties at Red Bluff, and that public convenience and necessity will be subserved by such connection; that the portion of the expense of making the connection to be borne by defendant will not exceed $50 and that the amount of business which will be transacted through such connection cannot be accurately estimated; that 457 of complainant's telephone stations are held by subscribers who do not have telephones belonging to defendant, or connected with defendant's system, and that the persons using these 457 telephones are without long distance service; that the service of complainant's telephone system is far superior to that of defendant, and that it would be a hardship upon the subscribers of complainant's system to be compelled to use defendant's telephones in order to secure long distance connection.

The complaint in Case No. 272 is practically identical with that in Case No. 271, except that complainant's property is situated in Glenn county and consists of some 889 telephones, of which 570 are held by subscribers who do not have telephones belonging to defendant.

On June 3, 1912, the defendant in each of these cases filed its answers, which answers are almost identical in form, and deny most of the material allegations of the complaints.

The two cases came on for hearing on June 14, 1912, at which time they were consolidated for hearing. At the close of the hearing, both parties requested permission to file briefs, which permission was granted. The briefs have been filed and the cases are now ready for decision.

The Tehama County Telephone Co. operates a telephone business within the county of Tehama, consisting both of local exchange business and of toll business within the county. The Glenn County Telephone Co. operates a telephone system within Glenn county and a toll business within that county. Each of these companies also does a long distance business with the other county by means of a toll wire circuit running between Red Bluff and Willows on the poles of the Postal Telegraph Co.

The Tehama County company has two exchanges and the Pacific Telephone & Telegraph Co. has three exchanges in Tehama county. The Glenn County Telephone Co. has four exchanges and the Pacific Telephone & Telegraph Co. operates seven exchanges in Glenn county, including some magneto exchanges at Fruto, Winslow and Elk Creek.

On April 29, 1912, the Tehama County Telephone Co. had 698 subscribers, of whom 457 did not have one of defendant's telephones. On the same day the Glenn County Telephone Co. had 889 subscribers, of whom 570 were not duplicated by defendant. On March 31, 1912, defendant operated some 870 telephones in Glenn county, of which something over 600 were owned by defendant and the remainder were owned by farmers and were connected with what is known as farmers' lines. On the same day defendant operated in Tehama county 1,003 telephones, including a considerable number of farmers' telephones.

Of all the rural telephones in these two counties operated by defendant, 70 per cent. are owned by farmers and only 30 per cent. by defendant. In other words, defendant's exchange development has been largely confined to the towns and cities, while the telephone lines in the country operated by defendant have been constructed and are owned by the farmers themselves.

As stated by complainants, the value of the plant of the Tehama County Telephone Co. is something over $60,000 and that of the Glenn County Telephone Co. something over $73,000. On January 1, 1912, the value of defendant's exchange plant in Glenn county, as stated by defendant, was $66,000 and of its toll plant $34,150, making a total of $100,150. On March 23, 1912, the value of defendant's exchange plant in Glenn county had increased from $66,000 to $76,000. On January 1, 1912, the value of defendant's exchange plant in Tehama county, as stated by defendant, was $75,000 and of its toll plant $60,000. making a total of $135,000. On March 23, 1912, the value of defendant's exchange plant in Tehama county had increased from $75,000 to $88,300.

The Glenn and Tehama county telephone companies own all the plant which they operate except what is known as "Swanson's" line, extending from Red Bluff northeasterly and operating somewhat in excess of 60 telephones. Defendant owns the toll plant which it operates and the exchange plant within the cities and towns, but, as has been said, at least 70 per cent. of the exchange telephones operated by defendant within the country districts are owned by the farmers.

BELL HAD NOT BUILT RURAL DISTRICTS.

The Glenn County Telephone Co. started operations in 1908 and the Tehama County Telephone Co. in 1911. In 1908, at the time when the Glenn County company commenced its operations, the defendant confined its operations principally to the cities and towns. It did not build into the outlying districts and the farmers were obliged to build their own lines. At that time the service of the defendant was very much poorer than it is at present.

The defendant company at that time operated what is known as the magneto telephone system. In order to get central by this system it is necessary to turn a crank, and when central desires to reach a subscriber on the line, central turns a crank, whch rings the bell on each of the telephones

on the line. This system permits what is known as "rubbering" by each of the other subscribers on the line taking down their telephones in order to hear what is being said, and the noise of the ringing of other subscribers' telephones is undesirable. During the same period defendant refused to go out and repair the farmers' lines for the farmers, with the result that the farmers had to do the repairing themselves. The poor quality of the service and the failure of defendant to build into the country districts resulted in the formation of the two Independent companies.

The defendant company was the first in the field and built a toll line running north and south through Glenn and Tehama counties to the present exchanges at Willows and Red Bluff. When the Independent companies started their operations they duplicated this portion of the defendant's system. The Independent companies then began building out into the country in both sides of these counties and developing territory which had not been developed by defendant.

Clear Intent to Drive Independents Out.

During the early portion of 1912 the defendant company began to build out into the country districts and to duplicate a very large portion of the lines of the Independent companies. In all cases except the toll lines heretofore specified and the exchanges connected therewith in cities and towns along the line, the Independent companies were in the field first. After January, 1912, in Tehama county, the defendant duplicated the line running southwest from Red Bluff to Paskenta, which was formerly an Independent line and had been purchased by the Tehama County company. The defendant also duplicated Swanson's line, running northeast of Red Bluff, these two lines being the two chief lines running into the country from Red Bluff. The defendant company also duplicated various other lines which had been built by the Tehama County company.

After January, 1912, and particularly after March 23, 1912, defendant duplicated the lines of the Glenn County Telephone Co. to the north, east and south of Orland, in the vicinity of Willows, particularly east to Glenn and south into what is known as the Packer Tract. The result of these duplications in these two counties has been that at the present time most of the lines of the Independent companies have been duplicated by the defendant company. It is clear from the evidence that the purpose of this duplication is to drive the Independent companies out of business. Another device used to this same end was to give free exchange service between towns which had not theretofore had such service, such as between Willows and Butte City, and Red Bluff and Los Molinos.

After the advent of the Independent companies the defendant company materially improved its service within the cities and towns. It now largely has installed what is known as the common battery system, which is a considerable improvement on the old magneto system. The latter system, however, is still in use by defendant throughout the country districts of these two counties.

The Independent companies operate throughout their entire territory what is known as the Dean harmonic system. This is a system whereby the bells are tuned to respond only to certain currents so that only one bell on the line rings at a time. The ring of the bell is considerably louder than that of the ordinary magneto system, so that the people outside of the house can more readily hear it.

Independent Service Superior.

The uncontradicted testimony in this case is, that the present system of the Independent telephone companies is very much preferable to that of the defendant company. This was the testimony both of men who used only the telephones of the Independent companies and of others who used the telephones of both the Independent companies and of defendant company. During the course of the trial, after the Independent companies had introduced a number of witnesses, all of whom testified that the service of the Independent companies was superior to that of defendant company, the defendant stipulated that the users of Tehama and Glenn counties of the service of the Independent companies would all testify that the service of the Independent companies is superior to that of the defendant company. In view of this stipulation it became unnecessary for the complainants to introduce further testimony on this point.

We find as a fact from the evidence in these cases that the present service of the Independent companies is superior to that of the defendant company with reference to speed in reaching the party at the other end, the clearness of the sound and quality of the service.

A portion of the territory in Tehama and Glenn counties is at present served by the Independent companies, but not by the defendant company. Among these points are Paynes Creek Postoffice and Inskhip, which are exclusively served by Swanson's line; Battle Creek Bottom, as to which the facts are the same; the Bayliss district in Glenn county, exclusively served by the Glenn County company; the district south and east of Willows, which is exclusively served by the Glenn County company; and also a number of other lines out from Proberta and Corning.

It also appears from the testimony that the Independent companies have over 1,000 subscribers who do not have telephones of the defendant company and that these people would like to have long distance service. It appears further that these people are confronted with the alternative of continuing their present superior local service without the advantage of long distance service, or of being compelled to take an inferior local service so that they may be able to avail themselves of the defendant company's long distance service.

Public Necessity Demands Connection.

On the question of public convenience and necessity, all witnesses who were asked the question testified that, in their opinion, public convenience and necessity demanded the connection asked for. This was the testimony both of witnesses who used the telephones of the Independent companies exclusively and of those who used both telephones, and from all evidence on this point, we believe that public convenience and necessity does demand the connection, and we find as a fact that the public convenience and necessity require the making of the connections as prayed for.

While defendant argued that there were difficulties in making the connections desired and also in transmitting calls from the system of the Independent companies to points on the defendant company's lines, it appears from the testimony that, in a large number of cases, defendant does have physical connections with other Independent companies which are not subject to its control.

The defendant company has held and now maintains connections for long distance business with telephone plants located in the following cities in California: Los Gatos, Gilroy, Morgan Hill, Sanger, Reedley, Healdsburg, Colusa County, Corcoran, Redlands, Ferndale, Corona, Whittier, Roseville, Calistoga, Guerneville, Sonoma, Lakeport, Lindsay, Exeter, Lemon Cove and Weed.

In quite a number of cases the defendant company maintains physical connection with a telephone system not using the Bell telephone. At the hearing defendant admitted that a physical connection between its system and that of the Independent companies, which use the Dean, or Home, telephone, is practicable and that there is no insuperable operating difficulty connected therewith. The defendant company at present has connections with the following exchanges in California, using at least in part instruments other than the Bell telephone; Colusa county, Healdsburg, Lindsay, Los Gatos, Morgan Hill, Roseville, Gilroy, Sanger, Corcoran, Lemon Cove and Reedley. In addition to these places, the defendant company, under per-

mission asked for by that company and granted by this commission, has installed a physical connection between its plant in the city of Pasadena and the plant in said city formerly owned by the Home Telephone Co., of Pasadena, using the Home telephone, and as the result of that connection, subscribers having the Home telephones are conversing without apparent difficulty over long distance with points on the lines of the defendant company and vice versa.

In this connection we would draw attention also to the fact that Swanson's line, running from Red Bluff northeast to Tahama county, which line uses the Dean telephones, was for a time connected with the defendant company, with apparently no complaint as to operating difficulties on the part of the patrons desiring to secure long distance connections with points on the lines of defendant company.

Varying Estimates of Connection Cost.

Mr. Burkett, defendant's engineer, testified that connection could be made between the lines of the Tehama County company and the defendant company in Red Bluff, and the lines of the Glenn County company and the defendant company in Willows by stringing between the offices a 25-pair No. 19 gauge cable and that it would be necessary to set aside one operating position in each of these offices. He estimated the cost for the Red Bluff connections at $500 and for the Willows connection as $450, not counting the operating positions. He stated that the operating position in Red Bluff would cost approximately $350 and that in Willows approximately $500.

Mr. Lindstrom, the Independent companies' engineer, testified that connection could be made by the use of a pair, or two pairs, of 22 gauge wires in Red Bluff, with the necessary appurtenances and that the cost of the connection would be between $20 and $25. He stated also that the Tehama County company now has on hand a cable which may be used for this purpose. He testified that $35 would cover the entire connection, with necessary labor and material. He testified that the cable itself was worth about $500. He testified that the present operators of the defendant company's switchboard could handle the toll business between the two telephone companies, and that $15 would cover the cost of extra equipment in the office of the defendant company at Red Bluff to prepare itself for the additional business. He further testified that the cost of connection would be about $35 at Willows, and that the defendant company has just installed a new switchboard there.

There was considerable testimony, both direct and by analogy, bearing on the amount and revenue of increased toll business coming to the defendant company in case the connection should be ordered.

Defendant with its 870 subscribers in Glenn county received from inter-county toll business in that county for the first three months of 1912, $2,395.52. For the same period the company received from its inter-county toll business in Tehama county, $2,158.15. By applying these returns to the 1,000 telephones now served exclusively by the Independent companies, a fairly accurate estimate could be secured as to the amount of business which may reasonably be expected from those 1,000 telephones, if connected with the defendant company.

At Healdsburg, which is served by the California Telephone & Light Co., which has long distance connections with the defendant company, the average toll receipt per station per month is 46.8 cents. In the Sacramento Valley district the average per year for each station owned by the defendant company in 1911 was $10.12, or 84.3 cents per month. During the same period the average for all stations in the Sacramento Valley, including connecting and sub-licensed stations, was $8.42 per year, or 70.1 cents per station per month. The toll business originating from the Colusa County company from May, 1911, to April, 1912, was $4,112.34 for 759 telephones, being an average of $5.40 per telephone per year, or 45 cents per telephone per month.

Claims "Perpetuation of Economic Fallacy."

Prescott H. Coolidge, a witness called on behalf of defendant, testified that the effect of the proposed connection on defendant's local exchange business would be to "perpetuate an economic fallacy" by causing the useless duplication of plants. He stated that defendant would doubtless receive an increased toll revenue, but that this result would be produced at the expense of its exchange business. Mr. Lindstrom, the Independent companies' engineer, testified that, in his judgment, the question would resolve itself into the survival of the fittest and that the superior service would win out in the end. He would not commit himself as to the effect of such connection on the number of local telephones of the defendant company further than to say that the company which gave the best local service would secure the business.

Defendant has insisted that to make the connection would be to give the use of a portion of its system to the Independent companies, and to that extent would deprive the defendant of the control of its own property and of the use of its property, without due process of law. We find that this point is not well taken. If the connections were made, the defendant's property would remain under the exclusive control of the defendant and its operators.

The operators of the Independent companies would have no control over the defendant company's property. The defendant company would be interfered with in its operation only to the same extent as would be true in case of the receipt of so much new business from any other source. The result would be analogous to that if the defendant company bought some Independent company and then received so much business from that company.

The only important contention of the defendant herein is as set out in the testimony of Mr. Coolidge, a witness called in the defendant's behalf, that to grant the relief prayed for by complainants would perpetuate an economic fallacy because it would lead to duplication of facilities in the case of a natural monopoly.

While we agree that, as a general proposition, the interest, both of the public and of the consumers of a public utility, which is a natural monopoly, may be better served by one agency than by two, yet there are very important reservations which must be made from this statement. The only warrant for the existence of a monopoly of any sort must be found in the advantage to the consumers and patrons of such monopoly.

Effect of Competition on Rates and Service.

The reason why it is ordinarily believed that competition between natural monopolies is advantageous for the patrons of such monopolies is the fact that, following such competition, there is usually a reduction of rates and an improvement of service. Whenever humanity finds that one experience is invariably followed chronologically by another, humanity is inclined to believe that the second experience is the result of the first.

That such is not the fact may often be demonstrated. The lower rates and more adequate service which follow competition between natural monopolies are rates and service which demonstrably could have been afforded by the monopoly without competiton, unless the lower rates and improved service which follow such competition are of a character which the agency according them cannot afford to give.

In short, when we find that a power company, for instance, lowers a rate when a competitor comes into a field, or improves its service, we can readily see that such power company could have lowered its rate before the competitor appeared, and it likewise appears that it could have

legitimately made it even lower before the competitor appeared than it now voluntarily accords under competition. Before the competitor appeared it did not have to divide its consumers with anyone.

A reduction of rates of a natural monopoly and improvement of service under competition is an indication of one of two things, either that the rates are too high and the service not good enough before the competition arose, or that the rates are made too low and the service too good for the price under the stress of the competition. The former result could and should have been brought about without competition; the second result cannot be permanently maintained even under competition unless the utility according too low a rate is charging too high a rate elsewhere.

Rate Cutting to Drive Out Competition.

The common practice, of course, is to make the rate too low and drive out the competitor, and after the competitor is eliminated, or a combination effected, to raise the rate and recoup for losses attendant upon the rate war. We consider it bordering very much on effrontery for a public utility to urge that it is an economic fallacy to duplicate facilities, unless such utility has accorded to the public the advantage to which the elimination of duplication is supposed to entitle it.

In this case it was testified by Mr. Coolidge, witness for the defendant, that when the company which he represents absorbed its opposing companies in Oakland and San Francisco, and thereby eliminated at least in part the economic fallacy, it actually reduced the number of employes used to serve the public of these cities while the competition existed. It is hard to persuade the public that an economic fallacy such as here under consideration is not as to it, the public, a good thing, when, as a matter of fact, when the economic fallacy was inflicted upon them their condition was better than either before or after the existence of such economic fallacy. No public utility, or no other monopoly, as far as that is concerned, can ever justify, nor should it be able so to do, its existence as a monopoly on the theory of an advantage to its patrons which it does not accord.

Disposes of "Economic Fallacy" Claim.

In the case before us, however, we do not admit that granting the relief which the complainants ask will produce an economic fallacy even under the defendant's theory. The major portion of the duplication which exists, and particularly that in the rual districts, was brought about by the failure of the defendant company adequately to serve the public. The duplication now exists, and the granting of the application, instead of bringing about duplication, will minimize the effect of it.

In granting this application we desire to reassert the policy which was laid down in the case of Pacific Gas & Electric vs. Great Western Power Co., decided by this commission on June 16, 1912, to the effect that where a utility adequately serves the public at reasonable rates and the territory is completely served, this commission's inclination will be to permit such utility, if it be a natural monopoly such as a telephone or lighting company, to hold its field free from competition, but that failure so to do will result in this commission's permitting competition when a competitor applies.

We find that the defendant herein has not adequately served the public in the territory in question, and that such failure on the part of the defendant has directly brought about and called into being the Independent companies which now desire this connection. And we desire to warn the defendant that in order to maintain and justify a monopoly in any portion of the state it must accord as good, if not better, service when competition is not imminent as it can afford under competition.

The reduction in the number of employes when competition is eliminated is the very opposite from what this company should do, and we believe that such a proceeding is absolutely unwarranted. We, therefore, are of the opinion that no duplication will be brought about by reason of this order, and, hence, no economic fallacy produced, and we are further of the opinion that the duplication that already exists is the direct result of the default on the part of the defendant in the adequate performance of its duty. We submit the following form of order:

Order.

The Tehama County Telephone Co. and the Glenn County Telephone Co. having filed with this commission their respective complaints againt the Pacific Telephone & Telegraph Co. requesting an order of this commission for a physical connection between the lines of complainant and defendant companies, and for the establishment of through routes and joint rates, tolls and charges as specified in said complaints, and said proceedings have been consolidated for hearing and a public hearing having been duly held thereon, and evidence having been introduced by all parties to said proceedings, and the Railroad Commission being fully advised in the premises, we hereby, in reliance on the evidence in this case, make the following findings of fact:

1. We find as a fact that a physical connection can reasonably be made between the lines of the defendant company and the lines of the complainant Independent telephone companies, between their respective exchanges in Red Bluff and Willows, and that the lines of these companies can be made to form a continuous line of communication by the construction and maintenance between and in said respective exchanges of suitable connections for the transfer of messages or conversations.

2. We find as a fact that public convenience and necessity will be subserved by such connections.

3. We find as a fact that the companies parties to these proceedings have failed to establish joint rates, tolls or charges for service by or over their lines and that joint rates, tolls and charges ought to be established to the extent hereinafter indicated.

4. We find as a fact that the purpose for which these connections are desired and herein ordered, is not primarily to secure the transmission of local messages or conversations between points within the same city and county, or city or town, but rather that the purpose is to secure the transmission of long distance or toll messages and conversations from a point in one city, or town, or county to a point in another city, or town, or county, to the extent hereinafter indicated. Basing our order upon the foregoing findings and the further findings contained in the opinion which precedes this order, it is hereby ordered as follows:

1. That a physical connection be established between the telephone exchanges of the Tehama County Telephone Co. and the Pacific Telephone & Telegraph Co. in the city of Red Bluff, California.

2. That a physical connection be established between the telephone exchanges of the Glenn County Telephone Co. and the Pacific Telephone & Telegraph Co., in the city of Willows, California.

3. That through routes be established over said connections for the purpose of conveying long distance or toll messages and conversations to and from the lines of complainants in Tehama and Glenn counties, in California, from and to the lines of defendant in other counties in the state of California, not to cover the transmission of messages

between points in Glenn and Tehama counties, and that this order shall apply only to California state business.

4. That joint rates, tolls and charges be made and used, observed and in force in the future over said through routes, these rates, tolls and charges to be the same as the rates, tolls or charges now or hereafter to be established between the points affected, respectively, in Tehama or Glenn counties and other points, as affected, in the state of California, on the lines of defendant company. If the companies cannot agree upon a division between them of the joint rates, tolls or charges herein established, they shall so notify the commission within 20 days of the date of this order, whereupon the commission will proceed to establish such divisions by supplemental order.

5. That the cost of installing the physical connections shall be borne by the complainant companies.

6. That the companies are directed to agree, if possible, upon the rules and regulations to govern the use of said physical connections and the transmission and transfer of messages ond conversations over the same. If the companies cannot agree upon such rules and regulations, they shall notify the commission within 20 days of the date of this order, whereupon the commission will establish such rules and regulations by supplemental order.

7. This order shall be complied with within 30 days from its date.

Development of Telephone Service Association Plans

What the Association Means to the Smaller Company—Comparison with Accident Insurance for the Individual—Broadening of the Field—Paper Read by Field Manager and Assistant Secretary at Convention of National Association Held in Chicago

By Frank L. Eldridge

I have represented the Telephone Service Association in the field since January 15, securing new members, making the objects of the association known, and generally getting a line on plant conditions. I have particularly tried to gather information concerning shortage of facilities for proper handling of toll business, as well as any other data which will assist in clearing up some of the conditions now existing, and which prevent the Independent companies from having routed over their lines a fair portion of the great volume of business new being handled by other public utility companies, both telephone and telegraph.

Practically every company I have visited is strongly in favor of a permanent Service association which will permit them to consult the various committees at any time and receive information that will enable them to overcome some of the difficulties with which they are confronted. I have found in many instances that operating companies have had to pay dearly for consulting service similar to that which this association offers its members without charge, except the regular dues. Some of our members have already secured considerable advice from this association, and have been greatly pleased with the results obtained.

Some companies have not endorsed the by-laws, as they are inclined to be skeptical regarding the permanency of the organization. The way for you to make this association permanent is for you to give it proper backing and support. That done there can be no question of its permanency. As an indication of confidence in the movement, some of the members have made large individual subscriptions in order to carry on the preliminary work until the association has a membership which will make it self-sustaining.

There is no reason why standard operating methods cannot be made at once effective, if proper co-operation exists between connecting companies. You can help to bring this about by joining the Service association, if not already a member, and by talking its benefits to non-members wherever you go.

The association, to my mind, stands to the Independent company, particularly the smaller one, as accident insurance does to the individual. I carry such insurance, as no doubt many of you do, and I know we all hope it will not be necessary to call on our casualty companies for benefits. But, if we are injured or unable to handle our business by reason of accidents or mishaps, we are in position to call on these companies for assistance.

This association is very similar. While you may have your plant in excellent condition and running at full capacity, you may at any time be placed in a position where you will need assistance. If you are a member of the Service association, you are protected against contingencies of all kinds. An investment in a membership in this association is a good investment. It is a sound one. It is one which will pay big returns.

In addition to what has been mentioned it is hoped that, through the association, the various companies will be brought in closer relationship with each other in every way.

As soon as the organization is well established on a good basis, I expect to spend considerable time in the field keeping in touch with the various members, noting their service complaints in regard to lack of facilities or poor service of any nature, and taking them up with the company at fault in an endeavor to bring these companies together and to eliminate the difficulties that have been experienced.

This association is not maintained merely as an organization to which you pay dues. Our members, on the contrary, are earnestly requested to write in for advice at any time regarding any matters that may come up in connection with the operation of their plants. Furthermore, one of our engineers will call on a member at any time and assist him in every way in the bettering of conditions of the plant, if it is necessary that such a trip be made, and the only cost to the company asking this service is the traveling expenses of the engineer.

It is expected a little later that our engineering committee will issue bulletins from time to time with helpful suggestions in regard to plant maintenance and other matters.

No doubt there are conditions now existing where a plant is run down and, either through the expense that must be incurred, or not wanting to bother a connecting company for advice, the plant is left in bad condition, thus jeopardizing the service all along the line. These conditions probably could be overcome at very little cost, if some one could be called upon for advice. All of these conditions are practically covered by the consulting engineers of the Service association.

Our operating rules are now effective in many places.

Many companies, with several small exchanges, have started schools of operation instruction among their forces and the operating has been placed on a much better basis through the placing in effect of our rules.

Lost circuit time can be greatly reduced by the use of our code. We know in many instances that the passing of reports has meant the taking up of a large volume of good circuit time, owing to the operators making their reports too long. You will find that if the information to be obtained from our books of operating instructions is placed in effect between your exchanges, you will be able to greatly speed up your long distance traffic.

I find, in the various states that I have visited, many associations which have been started, looking to the mutual benefit of the members, which are doing work of a practical nature. Yet none of them quite covers the ground which this association does.

There are, no doubt, many telephone men who are somewhat tired of the telephone business, but who would be glad to remain in it if they were meeting with success. I believe, frankly, that the failures of some of the companies are traceable to the poor service they have been giving. The Service association is in the field to assist in improving the service to such an extent that these companies will want to continue in the telephone business, without operating at a loss. The representatives here owe it to their companies and their subscribers to take advantage of this opportunity of placing their service on a proper basis, of increasing the general efficiency and of obtaining some of the revenue that they are now losing.

I dare say that new departments will be added to the association from time to time and it is up to you to make the organization a success. It was started with the belief that it would be permanent and, through the proper backing, it will become one of the greatest organizations in the field and one that you can all be proud of.

I have visited various companies in Indiana, Illinois, Wisconsin, and Minnesota. Every Independent company I have ever called upon is heartily in favor of this association. A large majority of the companies visited are now members of the association and are doing all in their power to insure its continuance. I have attended the state conventions in Illinois, Wisconsin, Minnesota and, in each instance, the representatives present expressed themselves as being more interested in the Service association than in any organization they have ever heard of before. The reason I have confined my visits to companies in the central states is due to the fact that our organization was started to cover only this territory. This week a special meeting was called and the name was changed to the Telephone Service Association. This extends our territory to the entire United States and Canada. This change, or expansion, was principally made on account of the interest taken by companies outside of the central states and I hope on behalf of the association that you will give the organization the support to which it is entitled.

Echoes from the National Convention.

There were several things of interest about the national convention held in Chicago last week, which escaped notice in TELEPHONY's report of the proceedings. Among these was the official badge, which was easily the most handsome and desirable ever prepared by the National association. The pendant was heavy and circular in form, with an irregular edge, the material being a metal of the appearance of silver, with French finish. The shield was reproduced in the center in colored enamel. On one side, in silver a manual desk telephone was shown in bas relief; on the other, an automatic desk instrument. Above the shield, in silver, a ribbon bore the word "National;" below, another bore the word "Association." Reading from top to bottom, therefore, omitting the words "local and long distance," in the center of the shield, the emblem gave the name of the National Independent Telephone Association.

Members' badges were suspended from a bar by a purple ribbon, bearing in gold the following: "Sixteenth Annual Convention—Hotel La Salle, Chicago, February 18, 19, 20, 1913." Exhibitors' badges were suspended from a blue ribbon, while the visitors' badges were the pendant alone, equipped with a pin. A fob strap was supplied with each badge, permitting the recipient to convert it into a fob if he chose.

THE BIG SHIELD IN THE CONVENTION HALL.

Another striking feature of the meetings of the association, and of the banquet Wednesday evening, was a huge electrically illuminated glass shield, which hung directly above the chairman's seat at the meetings and above the speakers' table at the banquet. This was beautifully done in colors and was a most effective decoration. It was supplied by the National association.

BIG REMOVAL OF BELL TELEPHONES AT LINCOLN.

Frank H. Woods, president of the Lincoln Telephone & Telegraph Co., of Lincoln, Neb., was called upon by Toastmaster Callahan, during the course of the banquet Wednesday evening. Mr. Woods, who recently took over the Bell properties in a large territory in his state, said among other interesting and felicitous things, that, on the twenty-second, his company would accomplish what was probably the biggest single removal of Bell telephone instruments ever recorded—cutting out upwards of 5,000 stations at one time. Everything had been arranged for the cut-over to the Independent system, which would consume but a few minutes. Later the instruments themselves were to be removed. Mr. Woods' announcement was greeted with applause.

TELEPHONY ILLUSTRATES TREE TRIMMING TALK.

On Thursday morning, a series of pictures was thrown on the screen illustrating proper and improper methods of trimming trees and of caring for them after trimming. These were taken from the article which appeared in TELEPHONY February 1, written by E. O. Lieghley. H. D. Stroud, of the Illinois company explained the pictures as they were shown.

New England Association Has Good Meeting.

The Vermont and New Hampshire Independent Telephone Association recently held its annual meeting at Wells River, Vt. Discussion was had at some length of the problems affecting the members, all of whom look forward to better conditions in 1913 than ever before. The meeting was voted a great success.

The following officers were elected: C. M. Libby, South Ryegate, Vt., president; A. T. Davis, Marshfield, Vt., vice-president; S. R. Kelly, Woodstock, Vt., secretary and treasurer.

In advising TELEPHONY of the outcome of the meeting, Secretary Kelly said, in part: "In place of the usual banquet we had a 'feast of reason and flow of soul,' departing therefrom highly exhilarated and strengthened for the future, which, now that 'Uncle Sam' is 'putting in an oar' in our behalf, promises the dawn and development of a brighter day for Independents.

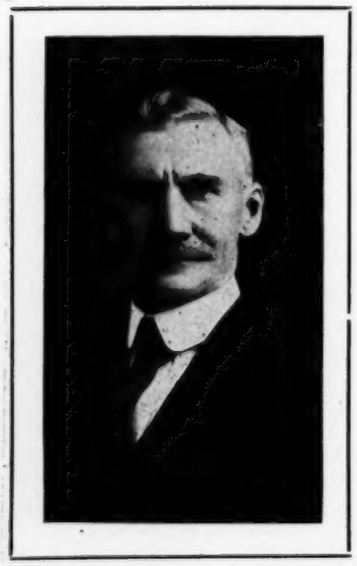
Fire Damages Aurora Switchboard.

Fire this week burned three sections of the main switchboard of the Inter-State Independent Telephone & Telegraph Co., at Aurora, Ill., destroying nine operator's positions. The company will take immediate steps for replacement within a day or two, as soon as the insurance adjusters have appraised the loss. Service was entirely stopped for a time.

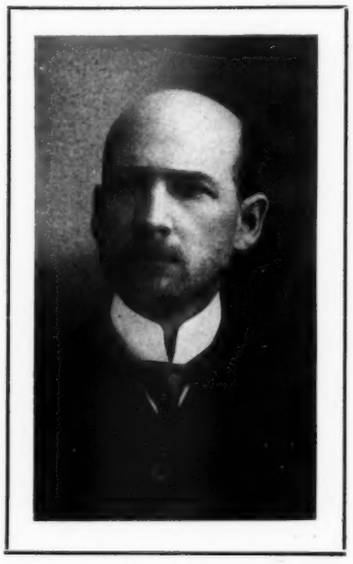
A Quartet of Men Prominent in the Telephone Field

BYRON E. COONEY, director of publicity for the Interstate Consolidated Telephone Co., Spokane, Wash., has identified himself particularly with the exploitation of the merits of the automatic telephone, eight of his company's 14 subsidiary organization's largest exchanges being automatic. Mr. Cooney issues monthly the Automatic Telephone News, which is circulated generally throughout the territory. He is the author of two booklets which stand probably as the highest quality of automatic telephone literature ever printed. One, "The Voice of a Great City," deals with the Spokane Home; the other, "Talking 1,000 Miles," treats of the entire Lane system—the Interstate Consolidated. These booklets have been widely circulated and have been used by many infant automatic enterprises, both in Europe and Australia, as well as America. Mr. Cooney also writes advertisements for 127 newspapers and has supervision of all the directories of the system. He is 34 years old, a member of several clubs, three years old in telephony and was formerly a newspaper man.

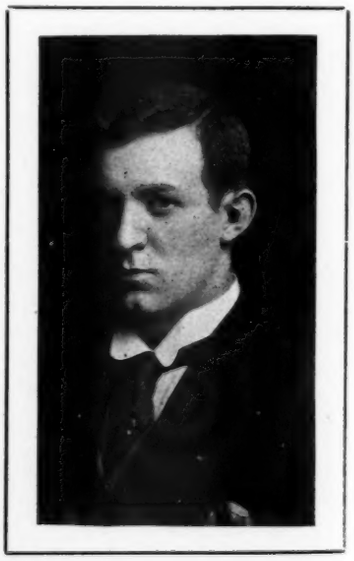
CONRAD ENGEBERG, president and general manager of the Interurban Telephone Co., of Lake Mills, Wis., graduated from the Chicago College of Pharmacy, in March, 1881, with the degree of Ph. G., and started a drug business in Lake Mills the following month. He continued in this line until 1904, when he sold his drug business. In 1896 he built an exchange at Lake Mills, and began operation with 20 subscribers; in 1901, when he sold to the Interurban company, he had over 200. He was out of the telephone business until 1904, when he was elected a director of the Interurban company. In 1907 he was elected president and general manager. The company now has three exchanges, Lake Mills, Waterloo and Iron Prairie, with 1,200 telephones and 40 miles of toll lines. Mr. Engeberg was born in Jefferson county, Wis., October 2, 1855. He is a Mason and an Odd Fellow, and a member of the Lake Mills Business Men's Assn., and the Lake Mills Improvement Co. He is deputy state oil inspector, secretary of the Atlas Casualty Co., and vice-president of the Bank of Lake Mills. He has been active in all Wisconsin telephone associations.



BAXTER F. VREELAND, is president of the Western Lumber & Pole Co., with its head office in Denver, Colo., and a branch in Spokane, Wash., and which operates 31 yards in northern Idaho, northeastern Washington and southeastern British Columbia. He was born in Bloomington, Ill., September 20, 1858. Abandoning his common school education when less than 15, he went with the Ft. Scott & Gulf R. R., out of Kansas City, handling baggage and studying telegraphy evenings. A year later he was an operator, doing extra work. He continued in railroad work for several years, when he associated himself with the Chicago Lumber & Coal Co., remaining with that firm for 15 years. The next five were spent on the coast with the California company, which he left to go to Denver to take charge of a lumber business there. A year later he sold out his interests and went into the cedar pole business for himself. At first he had both Idaho and Michigan yards, but, in 1909, he sold the Michigan properties. He is a member of the Denver Electric Club and the "Hoo-Hoos."



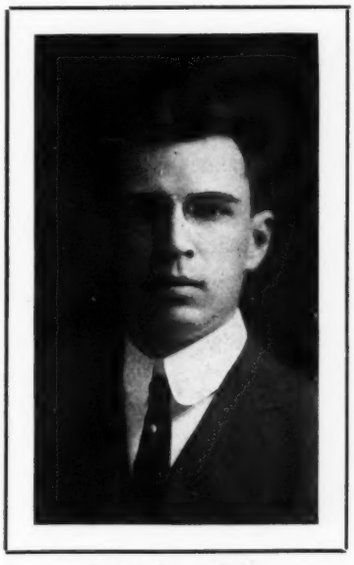
HUGH B. GILMORE, secretary and general manager of the Illinois Toll Clearing Co., with headquarters in Springfield, Ill., has specialized for years in accounting in various lines. Born in Kirkwood, Ill., November 28, 1880, he was educated at Monmouth College and Knox College and took up accounting work as soon as he entered commercial life. Before associating himself with the telephone business he was auditor for several large mercantile concerns. In 1909 Mr. Gilmore was made manager for the Macon County Telephone Co., operating seven exchanges, and in which he was a stockholder. Two years later he became manager of the Decatur Home Telephone Co., Decatur, Ill., operating an automatic plant. In January, 1912, he resigned to take charge of the Illinois clearing house. He has been active in the service organization from the first, a member of the executive committee and of the committee on operating rules. He has also been prominent in the Illinois association. He is a specialist in toll auditing and the conduct of operators' schools. He is an Elk.



Some Phases of Efficiency in Modern Business Life

Discussion of a Vital Topic, Prepared for Delivery at National Convention by Assistant Professor of Business Administration, in University of Wisconsin, Who is Also Member of Staff of Alexander Hamilton Institute, New York City

By Ralph Starr Butler



Ralph Starr Butler.

Efficiency is the biggest word in the business vocabulary. It has deeper significance and greater power than any other watch-word that has ever been used to open the doors of business success. It is a word to conjure with. It upsets respected precedents and wasteful ideas; it turns business men into scientists; it induces dreams of profits and visions of prosperity; and in some cases, alas, it calls up memories of sad experiences and shattered faith. For some queer things have been done in the name of efficiency.

Efficiency principles have not always been applied efficiently, and sometimes the principles themselves have not been understood by those who sought to apply them. We don't have to go far to find poorer and wiser men who have been lured into a hasty trial of ill-digested "efficiency" schemes; who have sunk their money and their faith in plans that did not work, and that never could work. These men sneer at efficiency; they set up their own experience as proof that the efficiency movement is visionary and impractical. Can we blame them? No. We can only be sorry for them, and heed the lesson.

The trouble with those who have been disappointed in efficiency is that they did not understand its true meaning. They are the victims of their unreasoning faith; they have rushed blindly in where others feared to tread. Efficiency itself is not to be blamed for their failures. If an untrained nobody who chooses to call himself an efficiency expert does grave wrong to a trusting manufacturer, the science of efficiency is no more at fault than is the science of medicine at fault when a quack sells his panacea to an eager sufferer.

There is much that is alike in the history of the efficiency movement and in the history of the development of system in business. System was the big word a few years ago, just as efficiency is the big word today. All of us can remember the blossoming of system. Business was to be born again. A filing cabinet and a card index were to send profits soaring. And, for a few years, there was an orgy of records and files and cards and devices.

The means were mistaken for the end. Business men spent good money in making records without adequate analysis of the value of the records and without planning for their profitable use. As a result system got a bad name. The reaction came; and only now is system coming into its own again, but this time with a solid foundation of proved value. The wastes have been weeded out, and the good remains. Manufacturers of system devices sell *service* rather than wooden boxes and pieces of paste-board.

I like the slogan of one manufacturer of a well-known office device: "You can't buy one unless you need it." That is the right spirit. And so it must be with efficiency. The confused period of ignorant handling of newly developed principles must soon end. The true meaning of efficiency will be better understood, and its principles will be applied with the care that must be accorded to all edged tools—used wisely they produce satisfaction; used unwisely they produce only regrets.

Efficiency is a big subject, and to try to cover all of it in a single paper would be about as sensible as to try to treat of the science of law or the science of medicine in a single short talk. I shall confine myself to a very few phases of efficiency. I am going to split my subject in two; to say something first about the application of efficiency principles to people who work with their hands, and then to show the application of the same principles to people who work with their heads.

When you hear the word efficiency, what is the first thing it suggests? To the average man it probably calls up another phrase, scientific management. Efficiency and scientific management are not synonyms by any means, but they are generally linked together in popular thought. So let me ask another question. When you think of the words scientific management, what mental image do they induce? I believe that to the average man scientific management means, first of all, time studies as applied to hand work processes. He has vague ideas about stop-watches and motion studies and the elimination of unnecessary movements. This is the popular conception of efficiency, because it reflects the spectacular side of the movement.

The general public had never heard of efficiency principles until men like F. W. Taylor began to give publicity to the spectacular results secured by their motion studies. I dare say that the story of Mr. Taylor's brick-layer who, through the aid of motion studies, was able to make an almost unbelievable increase in the results of his day's work is the background for most of our thoughts about efficiency. This is unjust to Mr. Taylor and to the efficiency movement; because I believe that Mr. Taylor's organization stands for something entirely different from the bald idea of motion studies, and I know that the real efficiency movement is based on an entirely different foundation.

Definitions of Efficiency.

Time studies and motion studies are only a very small part of efficiency. Yet they are a part and must be considered. Do they hold anything of promise for the telephone business? Let's see what efficiency really is. It means prevention of waste, and that is only another way of saving economy. How does efficiency eliminate waste and secure enonomy? That question is answered by another definition of efficiency. Efficiency consists in the doing of the right thing by the right person in the right way at the right time and in the right place. And scientific management consists in the substitution of laboratory methods of studying work for the old rule-of-thumb procedure, so that there may be exact knowledge as to what is the right thing, the right person, the right way, the right time, and the right place. This means simply the establishment of stand-

ards by which the work of all employes can be judged.

Can standards be established in the telephone business for those employes who work with their hands? It is not for me to say; it is a matter to be decided by engineers and those who know the telephone business. I am not an engineer, and I do not know the telephone business. I used to think I knew about it, but the longer I remain a subscriber the more forcibly I have it impressed upon me that my knowledge of the business is less than nothing. So I shall not intrude my own ideas. I find competent authority, however, for the statement that efficiency conditions in some telephone companies might be improved.

In Wisconsin we have a state commission with which some of you may not be unfamiliar. Its very peculiar function is to serve the public; and it serves the public by prying into the more or less private affairs of public service corporations in order to see in what ways service can be improved and the interests of all parties advanced. We call it the Railroad Commission, although its functions are by no means confined to the regulation of railroads.

Recently the commission has been investigating telephone companies in response to many complaints from subscribers; and the investigators found a difficult situation. No one seemed to know definitely just what standard telephone service meant. The investigators and subscribers might think that service was inadequate, while the investigated company might stoutly insist that the service was as good as it could be. What was the trouble? The trouble was that there were no standards by which the adequacy of service could be impartially judged.

In order to remove this difficulty the Wisconsin Railroad Commission has decided to conduct some efficiency studies on its own account; it is to try to find out just what ought to be expected of one operator under certain conditions, and what service the subscriber has a right to expect from certain units of equipment.

Does this hold any suggestions for the individual company? Does it not suggest that, if an efficiency study, based on scientific analysis and not merely on opinions, is possible by a state commission, it is just as possible by the individual company itself? I do not know to what extent the telephone companies of the country have adopted motion and time studies, but it does seem that there is a large field in which such studies might prove of value.

Use of Stop-Watches Requires Trained Men.

Here I want to insert a word of caution. Never forget for a minute that motion and time studies of hand operations are only a very small part of efficiency. Be very sure that the man who makes such studies is trained beyond the mere use of a stop-watch.

Hollis Godfrey, the consulting engineer and able representative of the Frederick W. Taylor organization, says that to put a stop-watch for motion study purposes in the hands of an inexperienced investigator is a crime; and I believe it. Why? The untrained stop-watch man thinks only of manual dexterity. He watches the best operator; sees how she economizes time and motion; times her movements; and publishes the results as the standard which all the other operators are to follow. He fails to take into consideration the thousand and one things, entirely apart from manual dexterity, which determine efficiency. The methods of the best operator, whose work is made standard, may be wholly unattainable, for a hundred different reasons, by the other operators.

This, then, may be set down as a general rule—that the conditions under which an operator works are of far more importance in determining her efficiency than her mere manual dexterity at the switchboard.

What should be the point of view of the employer trying to develop efficiency standards for his hand working employes? What conditions should he strive to bring about in order to get the most done with the least effort? There is one underlying principle which will be found applicable in all cases. The first thing the efficiency-seeking employer must do is to make his employes feel that his own interests and theirs are identical.

What is the general attitude of labor toward the efficiency movement? It is hostile, because many labor leaders think that efficiency is just another name for driving. They suspect that it has some cleverly hidden connection with the hated piece-work system. They think that it is a movement to get more out of workers and to give them less in return. In other words, they can't see how the worker benefits. This is the general attitude of labor, and it must be overcome. Who is responsible for it? The man who is responsible is the one who tries to develop efficiency methods without a real knowledge of what efficiency is.

Steps in Securing Efficiency.

We have already had several definitions of efficiency. We don't need any more, but we do need to examine a little more in detail into the work of efficiency from the standpoint of those who actually handle the tangible tools of industry. I am going to suggest the steps in securing efficiency as enunciated by H. L. Gantt, one of the pioneers in the efficiency field.

1. The investigation by experts into every detail of the business to ascertain where there is waste and how the waste can be lessened; in other words, the establishment of standards. Is this the only step? By no means; it is merely the first.

2. The development of suitable mechanism for putting the standards into effect; in other words, the development of mechanism which will result in each employe's being given a specific task, in seeing that he is furnished with suitable materials to perform the task, and in teaching him how best to perform the task.

3. The finding and training of workers who can reach the standards set.

4. (Notice this particularly.) The providing of adequate compensation for those who achieve the desired standard of efficiency.

5. The development of teachers from among the workers, so that the system will be self-perpetuating.

I list all five of these steps in order to call particular attention to the fourth one. Every efficiency expert recognizes that adequate compensation is a most vital part of the problem. Even some experts, however, I venture to say, do not realize how vital this matter of compensation is. Compensation doesn't mean merely money; it means many more important things than money. In order to be sure that we are on the right track and that we are not talking about unproved theories, let's see what another noted exponent of efficiency has to say on this point.

Harrington Emerson says there are twelve principles of efficiency. I am going to list them in order to show what emphasis he places on the employe's point of view. These are his twelve principles: Clearly defined ideals; common sense; competent counsel; discipline; *the fair deal;* reliable, immediate and adequate records; dispatching; standards and schedules; standardized conditions; standardized operations; written instructions; *efficiency reward.*

Each one of these principles is worthy many hours' consideration by itself. I shall call your attention to only two of them: *the fair deal* and *efficiency reward.* From the worker's point of view, these two surmount all the others in importance; and it is the worker's point of view that the employer must learn more and more to consider.

All this means simply that the problem of efficiency is very far from being a one-sided problem. It involves first, last,

and all the time the important and difficult problem of dealing with human nature. Any so-called efficiency movement that tends to make machines out of workers is bound to fail, and it ought to fail. It opposes the spirit of the times. The workers are waking up. They know their rights, and they rightly demand them. They refuse to work for the employer alone; they insist upon the opportunity to work for themselves as well as for capital. They know that their interest in industry is as great as that of their employers, and they are raising a united demand for the right to live and grow mentally and physically, as well as to work. The wise employer listens to the demand, and knows that he must not urge his own interests at the expense of the interests of his employes. He realizes that he and his workers must meet on a common ground.

The employer must do his part if the employes are to do theirs. What is his part? What is due the workers in return for their increased efficiency? What is scientific management from the worker's point of view? It is embodied in the one word, *Opportunity.* Is the efficiency movement something involving only stop-watches and time studies and greater profits for the employer? Or is it something designated to make this a better world for all of us to live in? If it is not the latter, then it doesn't deserve consideration.

Let me paraphrase a statement by Hollis Godfrey. He says that efficiency from the worker's standpoint means simply opportunity. Opportunity for what? *Opportunity, first, for good health.* The worker's health is his chief asset; if he cannot conserve it in his work, he is giving too much for the price of his labor.

Opportunity, second, for good work. Here is the worker's point of contact with the motion study idea. If standardized operations make it possible for him to do better work with no added cost of nervous or muscular energy, it is to the worker's benefit to follow those operations.

Opportunity, third, for good pay. The worker insists upon a fair share in the result of his labor, and he is entitled to it. Perhaps the efficiency-seeking employer confronts his greatest problem when he tries to find the best way to compensate those workers who are co-operating with him in increasing the efficiency of his plant. The problem must be solved to the worker's satisfaction, or all the employer's other efforts will go for naught.

Finally, efficiency means opportunity for advancement. The worker who is content to stand still is not the most efficient. The efficient system provides for promotion for those who deserve it; because, without this provision, the system is incomplete and cannot be expected to succeed.

From the point of view of the employe, therefore, efficiency —or rather, the scientific management which promotes efficiency—means simply opportunity—opportunity for four very definite things; and these things spell one word, justice. Is this a new idea of efficiency? If it is, then the time is certainly ripe to consider it. I think in the future we are going to hear somewhat less about motion study and a great deal more about human nature study in connection with efficiency. Man is not a machine, and he cannot be made one. The system that tries to take his individuality away from him is doomed to failure.

(To be concluded)

Federal Grand Jury at Work in Seattle.

Among the witnesses before the United States grand jury, now investigating, at Seattle, Wash., alleged violations of the Sherman anti-trust law by the Bell telephone interests of the Pacific Coast, will be Samuel Hill, president; J. B. Middleton, secretary and manager; and J. C. Potter, auditor, of the Home Telephone Co., of Portland, Ore., who have been subpoenaed, and who will appear to give testimony.

Jay Bowerman, attorney for the Northwestern Long Distance Telephone Co., and H. J. Roake, auditor, also have been served with papers requiring them to testify in the matter.

Mr. Bowerman is expected to be one of the most important witnesses before the grand jury. As attorney for the defendant company in the foreclosure suit of the Title Insurance & Trust Co. against the Northwestern Long Distance Telephone Co., now pending in the Multnomah county circuit court, he has gained a first-hand knowledge of events that have transpired between the Bell company and the Northwestern Independent which he represents.

Many Telephone Bills Pending in Wisconsin.

Numerous bills affecting telephone companies have been introduced in the Wisconsin legislature, and all will be considered in one hearing before the transportation committee on Thursday, March 6.

No. 87A, by Assemblyman Smart, would prohibit telephone companies in cities of the first class (Milwaukee only) from collecting in advance any rental for telephone instruments and fixtures, or for any telephone service rendered, or for any connection of a telephone instrument with the central exchange. The penalty for violation is fixed at $10 to $100.

No. 215A, by Mr. Walsh, is designed to require telephone companies and other public utilities to pay their employes twice a month or at shorter intervals. The penalty is $10 to $100, or imprisonment up to one month.

A bill by Assemblyman Schnitzler (No. 256A) reads: "No person, firm or corporation engaged in the maintenance and operation of a telephone system within the state of Wisconsin shall hereafter make a toll charge or a charge of a similar nature for the use of telephones or for talking over such system between two or more cities, towns or villages within the state of Wisconsin, if no such charge was made prior to January 1, 1913."

Assemblyman K. A. Johnson has a bill (293A) removing from the present statutes the law requiring telephone corporations to secure from the state Railroad Commission a certificate that public convenience and necessity demand a competing exchange in a community where one exchange exists.

Bill No. 294A, by Mr. Hedding, requires an annual license fee of $15 from telephone companies, together with percentages upon the gross receipts.

Municipal telephone systems, however incorporated, are contemplated in a bill (121A) by Assemblyman Minkley (social democrat). A referendum on the subject is a prerequisite, however. Systems thus established are to be independent, as to supervision and charges, from the state Railroad Commission.

Assemblyman Vint (social democrat) has a bill (149A) amending the railroad commission law to bring telephone companies under the statute which compels a public utility for a reasonable compensation to permit the use of its conduits, poles or other equipment on, over or under any street or highway, whenever public convenience and necessity require such use. The bill also gives the municipal council power to enact rules and regulations as to improved service by such utilities.

Bill No. 149A, by Assemblyman Axel Johnson, allows an appeal to the state Highway Commission from the refusal of town boards to consent to the construction of electric lines on highways. This is assumed to include toll lines.

No pending measure is of more importance to Wisconsin telephone companies than No. 20S, by Senator Teasdale, substituting the ad valorem system of taxation for the present license fee method. At present telephone companies are the only public utilities in Wisconsin not under the ad valorem plan of taxation.

Afterthoughts

A Successful Convention—George Washington

By J. C. Kelsey

Well, it was a fine convention! I hope you went home, feeling that you had not wasted time and money, and that you realize more than ever what an excellent business you are in. Further, that you have decided to extend your service to the need of every existing and waiting subscriber.

The convention elected an excellent board of directors, and I believe not one needs advice regarding our expectations.

I was just a little bit disappointed, as I hoped to see a board composed exclusively of large and small operators. There are dozens of operating companies whose single investment exceeds that of all the manufacturing plants put together.

However, it was the will of the convention voters and that settles it, as far as I am concerned—there will be no contest.

While there was no great excitement, there was a large crowd bent upon improvement of conditions. The Service association did itself proud, and will be a factor of increasing importance at the annual meetings.

President Savage gave an excellent address, as usual—one of frankness and fairness, and hitting the nail on the head as well.

He showed clearly the enduring factor of local control. It is the very foundation of telephone success. It was a good point, too, showing that the colonel of the rural districts has more power than a so-called captain of industry.

If every Independent telephone man could make each director and official realize that, in a local contest, each one of them has more power than all the minions and cohorts of a billion dollar universal company, we could all settle down to a constructive and prosperous life.

I liked another point, too, that the great centralized Harriman idea in railways would have fallen apart from its own weight. It is a well-known fact today that centralization of industry is an exploded theory.

It has been proved that scattered industry is by far the most effective income-producer, as well as a preservative of quality standards. The greater the centralization, the greater becomes the unproductive load which, after all, is the waste around a plant.

I believe that the knee of the great saturation industrial curve has been passed. You know, in electrical matters you can excite an electromagnet so far, up to saturation, and then the power falls off, however much you increase the excitation.

So it will be in business circles. Men may still believe in centralization and push it with all mortal might, but they can not dispute the law of decline after saturation is attained.

In telephone service we have a different yet peculiar condition. That difference lies in the personality of the telephone. It is a sensitive plant, dear to us, yet hardest on our temper and affections—possibly something like a growing boy of from 10 to 15 years of age.

It is a hard business for disinterested strangers to handle and control. The required affection and respect seems to be entirely missing.

It is a fact, too, that in the public mind there is a changing sentiment regarding regulated control. No one can expect the public mind to be still. It is ever moving. We never think the same or even look the same for very long.

There are states which have plunged into regulation with a vengeance, and are now agitating changes, for instance—robbing the commission of its powerful arm of "certificate of necessity." There are other states yet to try it, and try it they will, too!

So you can see that unanimity of the states is impossible, and much less that of telephone conditions.

The telephone business is one of contrasts. Were this not so, we would have been ruined long ago—swallowed up by the greedy divine righters of a decade ago.

It is a great thing, that men in Pennsylvania have different conditions from those of Kansas, and that Texas telephone conditions are not those of Ohio. It keeps our universal competitor facing enough conditions to baffle a Solomon.

It is by reason of these contrasts and apparent inconsistencies that we have the hope well defined that the captains of industry will yet learn to co-operate with the colonels of the so-called rural districts, instead of ignoring them or trying to destroy them.

Can you imagine any more trouble than the control of ten millions of telephones under one roof? Can you imagine the hopeless inefficiency of a machine, centralized to handle the nearly ten million problems they represent?

I remember well how hard it was for me, as a switchboard man of the Duluth Bell, to get decent trunks between the Twin Cities, and give anywhere near decent service against strong competition.

I finally wrote back to some potentate in Boston that the trunk circuits they gave me might satisfy Pawtucket and Nantucket, but they would not do for the local need of my territory.

I put in proper trunks, but up to the time I left that company, official permission had not yet been given. Possibly in the lapse of 10 years they have done so.

I like Mr. Savage's idea, that a universal idea is just as impossible as a universal rule for handling telephone systems. Each telephone company has its own problems, almost as many as it has subscribers. Each management can best decide upon its local needs, which, after all, is the secret of success.

South Bend had an example of this. The Bell company, in a hot campaign, ran its subscription list to 4,800. Just as victory was near an order came holding up activity—and then the backward march began, and terrible waste.

Someone blundered, or the order to quit firing was delayed. Anyway, strict local control would never have allowed such conditions.

If, in each local plant there is a secret of efficiency, then we can see that the universal system has a potentiality of economic waste in every locality and, in the end, a final ruin or dissolution into smaller units.

I believe we will all see the day when local influence will be more eagerly sought after than a good market for securities. Any system of publicity which strikes at the merit

of local industry, will weaken the foundation of a universal industry.

The publicity given the relatively few Independent failures has not failed in its effects to give the whole industry a black eye.

We have all gone into negative publicity too much—yet we have a sort of a homeopathic justification.

I could retort at this time by calling attention to the suit of the minority stockholders of the Central Union Bell. But, as a matter of fact, the suit comes too late.

There was a time when we would have enjoyed a general suit for the relief of the minority stockholders of the Bell licensees. But there are very few now, and they should have "hollered" when the time was ripe.

Even a child knows that a stock equity in Central Union is a pipe-dream. This particular company would have "busted" long ago, and wiped out all the stock, if the Bell treasury and other coffers had not been open.

There was a time when Central Union should have paid dividends because it earned them fairly. But competition came just at a time when the stockholder was due for a dividend—and it was all swept away.

This company is a sample of the dire effects of war. It is not too much to expect a full realization of its futility.

It seems to me that, until the 1913 convention—ever since I beheld Independent telephony for the first time in convention—there have been war measures involved.

This 1913 convention is the first one I ever saw where the ways of peace and constructiveness were followed. It surely is a good omen!

Those who have been at war can surely cry for peace without discredit.

At this time we celebrate the birthday of a man who was "first in war, first in peace and first in the hearts of his countrymen." Somehow I connect George Washington with our Independent telephone development.

George Washington was America's leader when we were revolutionists and every man's neck was in danger as a traitor.

I think old-fashioned Bell officials looked upon men who went over to Independent telephony in about the same light—hanging was good enough!

George had a hard time, keeping peace in his own ranks, retreating before a superior foe, yet winning our ultimate independence.

Washington is called "the modern Fabian." Fabian was an old Roman general, who won all his battles while retreating from the enemy. Washington, apparently, was on the retreat—then he would stop, let the other fellows catch up and give them a fight.

It strikes me that our Independent telephony has been more or less of a treat, yet we stand today in full realization of our powers, and in the recognition of the public.

We have given battle and supported great losses. The enemy not only handed out vicious publicity, but bought out our outposts and cut open our lines.

They never whipped an Independent company. They simply bought it, and the effect of a purchase is just the same. But we have always rallied again and gone back to the fight.

Today, no Independent telephone company need have any fear. The problems of destruction are over. We face the need of construction, not only of swords but of plough shares.

A lot of people are taking shots at Washington. I am sorry that history has attempted to make him a god! He was a human being, and why should he not have his share of human weaknesses?

He could swear when occasion seemed to demand it. He surely had enough to swear about. He was a man of the times, sane and honest, neither a divinity nor a devil. He could tell a lie just as easily as you and I, if the need arose.

When the emergency came, Washington responded. The world has never lacked for the right man in the right place!

In the Civil War, the country got the habit of discharging a general every time a campaign was lost. We have the habit of demanding a new pitcher at a ball game. Today railroads discharge officials when trains run off the track or go into wreck.

We simply demand Jonahs. No more necessary thing on earth exists than a Jonah. A large corporation must have them. If it were not for them, we would have a hard time getting back to earth.

I just heard a Jonah story which I hope is not true. Yet it shows the weakness of human nature, and of great combinations, and some of its hopeless inefficiency.

It seems that a district superintendent was sent from Harrisburg to take care of the war at Johnstown. After the outcome of the fight became apparent—the utter defeat of the Bell company—the manager was reduced further in rank and is now a country town manager.

If this is correct, it is a sordid revelation of weakness—to punish a man for the failure of a campaign which was born hopeless! It is just like punishing soldiers under orders from a colonel or general.

In a large company, the wrong man is too often punished for the failure. This can not happen in a small local company, for failure can be avoided.

I believe in strong state associations, because they can handle matters more directly than a national organization.

But by all means we should all meet once a year to renew acquaintance, as well as make new resolutions to go ahead. Alone, at home, you get "blue," and believe the other fellow is doing better than you are. Rubbing elbows soon shows all of us that we have reason to be happy.

I feel pretty good over the 1913 convention—it is the first one that really seemed profitable. It seemed to be the first time that telephone men ever met without a bone to pick.

Telephone men came this time to learn something of benefit to the business. The greatest lesson any Independent telephone man can learn is the value of his own business.

The greatest benefit is the elimination of fear, which will help both business and physical body. The greatest duty is the completion of your telephone system to the needs of your most distant and isolated subscriber.

If there ever was a time when telephone men should hug their properties to their bosoms, it is today.

With commission rule ahead, a certificate of necessity needed by future competitors, and a chance to earn a profit, there is no company with soul so dead that will not profit.

MORAL: Don't miss another convention.

Specifications and Tests on Telephone and Telegraph Wire

The Second of a Series of Articles Dealing with the Essential Properties of Wire—Points to Be Considered When Specifying Hard Drawn Bare Copper Wire—Tests Which Should Be Undergone By Wire—Methods of Packing

By Hugh T. Wreaks and E. J. Jones

Wire Inspection Bureau

BARE HARD DRAWN COPPER WIRE.

Copper on account of its high conductivity presents certain advantages which make it indispensable for long lines of telegraph and telephone work. It is not subject to corrosion of a destructive nature unless it may have been injured in process of manufacture or contains chemical impurities. It should otherwise give long life when used on pole lines of such span as to properly consider its physical qualities and not allow the strain of wire spans plus sleet and wind pressure to work the copper beyond its elastic limit. And it should be so handled in manufacturing, distributing and installing that this elastic limit should not be materially reduced by nicks or physical injury in one or more places.

The purity of copper is in a large measure checked by its conductivity supplemented by elongation and tensile strength, and the reverse is true as noted by table of impurities from proceedings of Railway Signal Engineers' Association. The table shows the effect of one tenth per cent. admixture of various substances with annealed copper.

Alloying Material	Conductivity Compared to Soft Copper 100 Per Cent.	Elongation Per Cent.	Tensile Strength in lbs. per sq. in.
Lead	99.38	36.2	27,165
Molybdenum	98.65	33.5	31,163
Cobalt	98.18	38.15	29,342
Silver	98.01	4.25	41,295
Sulphur	98.00	37.55	30,608
Gold	97.94	32.45	29,342
Selenium	97.86	30.42	38,758
Thallium	97.83	36.10	30,253
Zinc	97.76	35.32	38,506
Antimony	95.59	30.00	32,801
Tellurium	95.37	1.82	58,841
Platinum	94.80	38.80	28,986
Nickel	93.96	39.00	29,712
Tungsten	92.43	36.35	30,609
Tin	91.99	3.65	46,133
Chromium	90.75	33.55	32,615
Magnesium	90.06	3.75	51,996
Aluminum	86.49	35.20	31,519
Iron	79.68	32.65	31,377
Arsenic	73.89	39.10	30,879
Silicon	64.52	20.65	26,083
Phosphorous	51.86	31.25	33,327

Similarly quoting from a table of the American Steel & Wire Company's catalog, the effect of traces of impurities in conductivity of copper is shown below

Element	Per Cent. Present in Copper	Per Cent. Conductivity
Carbon	0.05	77.87
Sulphur	0.18	92.08
Arsenic	0.10	73.89
Silver	1.22	90.34
Tin	1.33	50.44
Aluminum	0.10	86.49

In the drawing of copper, it is handled in a hot state until it is reduced to a rod of ⅜ in. or ¼ in. in diameter according to the ultimate size down to which it is to be drawn. The last several drawing operations, when the wire is drawn through tapering holes in steel plates reducing from larger to smaller sizes until the exact desired size is obtained, are done when the wire is cold. In drawing to any size smaller than No. 16 B. & S., the operation is carried on similarly except that a diamond is generally used instead of a steel die. The number of operations performed on a wire to reduce it from a given billet to the exact size required, will affect its physical qualities, i. e., hardness, stiffness, elasticity and tensile strength, which increase in the drawing process, and elongation, ductility and electrical conductivity which similarly decrease.

Specifications for hard drawn wire generally call for material of such purity and quality that, when drawn hard, it shall possess properties and characteristics as specified. The points specified usually cover:

1. Ultimate strength.
2. Pitch (cables).
3. Relation between wire and cable strength.
4. Conductivity.
5. Elongation at break.
6. Weight per mile.
7. Diameter of individual wires.
8. Weight of coils, maximum and minimum.

This is substantially as per the following table taken from American Telephone & Telegraph Company's specifications, which gives the properties of hard drawn copper wire.

16 B.W.G.	.065	68.8	66.7	66,200	220	.91	96	50	32
14 N.B.S.	.080	103.9	101.3	65,600	330	.94	96	72	53
12 B.& S.	.0808	106.0	103.4	65,500	336	.95	96	72	53
13 N.B.S.	.92	137.5	133.9	65,100	433	.97	96	136	67
12 N.B.S.	.1040	175.7	171.1	64,600	549	1.00	96	218	97
9 B.& S	.1144	212.6	206.8	64,460	650	1.03	96	218	130
10 N.B.S.	.1280	265.9	259.4	63,700	820	1.06	96	218	152
10 B.W.G.	.1340	291.7	284.0	63,400	894	1.07	96	218	152
8 B.W.G.	.1650	441.7	431.1	62,100	1,328	1.14	96	218	152

The American Society for Testing Materials in a committee report at its 1909 meeting, recommended the mile ohm basis for measuring conductivity as follows:

For diameters .460 in. to .325 in., 900.77 lbs. per mile ohm at 20° C.

For diameters .324 in. to .040 in., 910.15 lbs. per mile ohm at 20° C.

The mile ohm has many practical advantages as a conductivity unit. The weight in pounds per mile is found by multiplying the square of the diameter of the wire in inches by the constant number of 16,030, this being figured on a specific gravity of 8.92.

Specifications for hard drawn copper wire do not generally call for elastic limit tests, not that these tests are not important but because from the nature of the material, it is very difficult to make them with any degree of accuracy. These tests are, however, important. When inspections are made by those familiar with this material, elastic limit tests should be made as accurately as possible and the results noted in reports, especially when wire is used in long spans and subjected to heavy strains in service.

In a measure the elongation and tensile strength tests, if carefully made, take the place of the test for elastic limit. In testing for elongation, the length of sample is important as results will show very differently if the sample is 10 inches, 2 feet or 5 feet long. Properly allowed for, the 5-foot samples make easier the final elongation measurements and make more likelihood of the break coming within the bench marks and not too close to jaws of machine. The speed of operation of the test machine also bears on the result. This latter

is also true in tests for tensile strength, and further, as affecting the accuracy of exact reading at the time of break.

Conductivity is generally taken on a Hoopes bridge, when a given length of sample for test is weighed and the weight and resistance read direct and checked off against the standard used with the machine. As there are several constants used in these tests, the accuracy and correct relation of these should be checked from time to time by calculations and test.

The tests here are shown not to be as complicated as with galvanized iron wire, on account principally of the absence of a protective coating. In a measure the same general remarks apply here, however, on physical and electrical qualities, in so far as cold drawing affects them and specifications are conceivable which may call for abnormal qualities alone obtainable by overworking the copper.

If properly made, hard drawn copper wire will, when new, show a bright shining surface. It will become slightly tarnished when allowed to stand exposed to air any length of time. If the wire rods have not been carefully cleaned before drawing, the wire will appear streaky and have a purplish oxidized appearance throughout. While this may have no harmful effect, it is indicative of carelessness.

The finished wire should be given a careful surface inspection and examination to be sure that it is free from any such imperfections as scales, splints, scratches and other visible defects. These are frequently caused by allowing dirt or grit to collect in dies; by using dies that are improperly cut; or by careless handling by operators when removing wire from machines. It is also advisable that all handling be done on wooden floors to prevent scratching as much as possible, as all the imperfections mentioned, are apt to be derogatory to the sustaining properties and the subsequent life of the wire in service.

It is a peculiarity of hard drawn copper that the strength, elasticity and ductility of the wire is largely contained in the surface shell, as the inner copper is brittle and apparently of a crystalline nature. It will therefore be appreciated that the manner of handling and packing is a very important feature. The material should be so protected and the coils be of such size and weight as not to be liable to material damage from ordinary handling in transport, although the eye of the coil should not be so small as to make it awkward to handle in stringing wire. The generally accepted practice for protecting copper wire is to wrap with good stout burlap. This should be put on tightly and each turn should overlap the preceding turn at least two-thirds of its width. On part carload shipments for long journeys where several transfers and consequent rehandlings are necessary, it would seem advisable to add an additional protective covering of burlap.

For transportation on salt water where there is a possibility of chemical action on copper, a specially prepared paper cloth under burlap is advisable.

The preceding paragraphs cover the salient points for hard drawn copper wire and in particular emphasize the value of the outer hard drawn copper shell, a point doubtless not recognized by mere users of this material.

(*To be continued.*)

The Telephone Inspector and the Troubleman

Continuation of a Series of Articles Begun in the September 7 Issue of Telephony—They Deal in an Elementary and Explicit Manner With Many of the Problems Encountered by Telephone Men in the Operation of Small Exchanges

By A. E. Dobbs

It will thus be seen by those who have inspected some plants, that George had no sinecure. But he gradually got the work cleared up, although it took many weeks, and then he found his work becoming easier. Will had plenty of time now to help him with it, so that he could sometimes afford to take a day in looking up new subscribers as well as going after other business. In some parts of the city his visits became more and more a matter of form, intended more to keep in touch with the subscribers than anything else.

It may seem strange, but it is a fact that the visits of an inspector to subscribers' houses to listen to their complaints and test their instruments, has a reassuring effect on them, and convinces them that the company is giving the best service it can. For example, a subscriber calls for a number. He may be answered promptly enough, but the party called does not come to the telephone until it suits his convenience. In many cases the service given by the company is blamed because it has no means of dragging the laggard to the telephone. Of course, an inspector can enlighten the subscriber on this and many other obscure points.

George had also learned another maxim, credited to Chauncey Depew, that "True greatness consists in being kind to newspaper men," or something to that effect. Hence nearly every week, issues of the local papers contained an account of something wonderful that had happened at the Independence telephone exchange. Sometimes he would place himself in circuit and let the reporters talk through his body. When they found no differences in the talking qualities of the instruments, even with two or three men in circuit, they would astonish the readers with the news. Again he would make up a couple of condensers and let the reporter talk to some distant town over the telegraph wires, while the operators worked away receiving messages as usual. Then he would persuade some operator to take a ride with him and telegraph from the train in motion, and as his apparatus was somewhat crude, being home-made, it did not cost a great deal for these experiments.

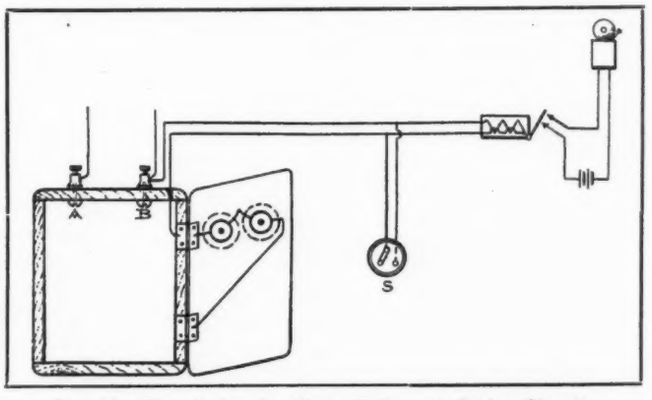


Fig. 51. Circuit for Auxiliary Bell on a Series Circuit.

He would have the manager of the system address the Lyceum Society or some other body on the "Wonders of the Telephone," or something of that nature, and give typewrit-

ten copies to the press. When he ran across an item that the United States had about 67 per cent. of all the telephones in the world and that the telephone, although only

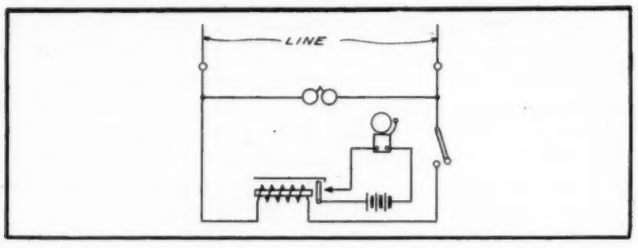


Fig. 52. Auxiliary Drop and Bell for Bridging Set.

35 years old, ranked fourth in the industries of the United States, the editors were allowed to see and copy it.

WILLIAM STUDIES EXTENSION BELLS.

After dinner one day George went around to the shop to see how William was doing his work.

"No. 213 wants a drop and an auxiliary bell at his place," said Will, "but I did not want to put them in until you showed me how. Do you connect that drop in series with the line?"

"What kind of a ringer has he?" questioned George.

"Why, it's an old-style instrument that we wired over."

"It has a 100-ohm coil. You have never connected one of those drops in, have you? Well, here is a diagram of your circuit (Fig. 51). Place a 100-ohm drop at any convenient place. Near the instrument is generally best, because it can be easily seen and inspected. Then disconnect the wire leading underneath from the right hand binding post, *B*, to the ringer; bore a hole, if there is none, through the top of the box, bring your wire through it and connect to the ringer side. Then connect your other wire to the right hand binding post, putting it in with the line wire. This gives you two wires to connect to the drop. Next you want a switch, *S*, to bridge across the line, so that when the subscriber does not want to use his drop, he can short circuit it. A battery and bell should be connected as shown in the diagram."

"Why not cut the line wire just before it goes into the set and put the drop in there?" asked Will.

"That," George answered, "would leave the drop in circuit while talking. With the plan shown in the sketch (Fig. 51) both drop and ringers are out when the hook comes up.

"This sketch (Fig. 52) shows how to do the same thing with a bridging bell. You simply use a 1,000-ohm drop and bridge it across the ringers, and as our bridging bells are cut out by the raising of the switch hook, we get the same result.

"You will notice, however, that the cut-off switch is looped into the drop circuit instead of bridged and that, to cut out the bell, you open the switch instead of closing it. This switch is sometimes dispensed with, the subscriber cutting out his drop by putting a rubber band around the lever or sticking a card between the drop contacts to keep the battery circuit from closing.

"It sometimes happens that, instead of a drop, an extension magneto ringer is used. Of course, you can connect them up the same way, except that you don't have any bell circuit to run. It is sometimes the case that two or three extension bells are put on one circuit, so that you can see the advantage of having them cut out when the switch hook comes up."

(To be Continued.)

Uniform Accounting System of Interstate Commission

Complete Details of Plan Promulgated by Government Body for Use of Every Telephone Company Having Annual Income of Upwards of $50,000—Plan for Smaller Concerns is Now Under Contemplation—System Effective Universally January 1, 1913

303. OTHER OPERATING EXPENSES.

This account should include the total expenses of operations, other than telephone operations, for the period covered by the income account statement. This account includes the expenses of the operation of property carried in balance-sheet account No. 111, "Miscellaneous Investments," when such property is operated by the accounting company.

304. UNCOLLECTIBLE OPERATING REVENUES.

This account should include federal, state, county, count for telephone and other services which, after a reasonably diligent effort to collect, has proved impracticable of collection. This account includes only uncollectible bills for amounts which have been treated as operating revenues; other uncollectible bills should be charged to account No. 323, "Uncollectible Non-operating Revenues," or to Corporate Surplus or Deficit account, as may be appropriate.

This account may include monthly charges, based upon estimates, to create a reserve for uncollectible bills, provided such reserve is adjusted annually in accordance with the experience of the accounting company. Such amounts should be credited to a sub-account under account No. 118, "Due from Subscribers and Agents," to which should be charged bills that have proved impracticable of collection.

305. TAXES ASSIGNABLE TO OPERATIONS.

This account should include federal, state, county, municipal and other taxing-district taxes relating to telephone property, operations, and privileges for the period for which the Income Account is stated. This account should also include the taxes on other property and operations, the revenues and expenses of which are included in accounts 302 and 303, respectively. (See Sec. 16.)

II. Non-Operating Revenues.

310. RENT REVENUES FROM LEASE OF TELEPHONE PLANT.

This account should include all revenues from the company's interests in telephone plant or equipment held by others under some form of lease whereby it surrenders possession of such property for operating purposes.

This account is intended to cover only rents receivable for the use of telephone exchanges or operating units held as a whole by others under some form of lease.

311. MISCELLANEOUS RENT REVENUES.

This account should include the revenues accruing to the company as a return upon rented property other than telephone plant and equipment, held by others under lease, as provided for in the preceding account.

NOTE.—If the property rented is so intimately connected with property used in the company's telephone operations that the expenses on the former cannot be ascertained, the revenues should be credited to account No. 505, "Minor Rents of Exchange Plant;" No. 515, "Minor Rents of Toll Plant," or No. 524, "Rents from Other Operating Property," as may be appropriate, and the

expenses in connection with the rented property should be included in the operating expenses.

312. Dividend Revenues.

This account should include dividends declared on stocks owned by the accounting company (and held in its treasury or deposited in trust), or controlled through lease or otherwise, the income from which is the property of the accounting company. Accruals of guaranteed dividends may be included in this account if their payment is reasonably assured.

Note A.—This account should not include credits for dividends on stocks issued or assumed by the accounting company and owned by it, whether held in its treasury, in special deposits, or in sinking or other reserve funds, or pledged as collateral.

Note B.—Dividends on stocks of other companies held in sinking or other reserve funds should not be included in this account, but should be credited to account No. 314, "Sinking and Other Reserve Fund Accretions."

313. Interest Revenues.

This account should include interest on funded securities of other companies owned by the accounting company (and held in its treasury or deposited in trust), or controlled through lease or otherwise, the income from which is the property of the accounting company; interest on notes, bank balances, and open accounts; and other analogous items, including discount or short-term notes. Interest accrued should not be credited unless its payment is reasonably assured by past experience, guaranty, anticipated provision or otherwise. In other cases the credit to this account should be based upon the interest actually collected.

Note A.—This account should not include interest on funded securities issued or assumed by the accounting company and owned by it, whether held in its treasury, in special deposits, or in sinking or other reserve funds, or pledged as collateral.

Note B.—Interest on funded securities of other companies held in sinking or other reserve funds should not be included in this account, but in account No. 314, "Sinking and Other Reserve Fund Accretions."

Note C.—At the option of the company there may be included in this account the portion applicable to the fiscal period of the amount requisite to extinguish (during the interval between the date of acquisition and the date of maturity) the discount or premium on funded securities of other companies owned.

314. Sinking and Other Reserve Fund Accretions.

This account should include the revenues accruing on cash, securities, and other assets (other than securities issued or assumed by the accounting company) in the hands of the trustees or specifically set aside for sinking and other special funds.

Note A.—At the option of the company there may be included in this account the portion applicable to the fiscal period of the amount requisite to extinguish (during the interval between the date of acquisition and the date of maturity) the discount or premium on funded securities of other companies held in sinking or other reserve funds.

Note B.—If the income on any special fund is retained in the fund, and if the fund is required to be represented by a reserve, the amounts credited to this account in respect to such income should be concurrently charged to account No. 350, "Appropriations of Income to Sinking and Other Reserve Funds," and credited to account No. 172, "Surplus Invested in Sinking Funds," or other appropriate reserve account.

315. Profits from Operations of Others.

Whenever in accordance with the terms of any contract the company is entitled to participate in the profits from operations of others, all revenues accruing to the company from such source should be credited to this account.

Note.—This account does not include any dividends or other returns upon securities issued by such separately operating companies, nor any remuneration for services or the use of property as provided for in account No. 526, "Licensee Revenue—Cr."

316. Miscellaneous Non-Operating Revenues.

This account should include all non-operating revenues not provided for in the foregoing accounts.

III. Non-Operating Revenue Deductions.

320. Rent Expense.

This account should include all expenses in connection with rented property, the rents of which are included in account No. 310 or No. 311, such as the cost of maintenance when borne by the company, the cost of negotiating contracts, advertising for tenants, fees paid conveyancers, collector's commissions, cost of enforcing payment of rent, cost of ousting tenants, etc. This includes the expense accruing while the property is idle and awaiting an occupant. It does not include taxes.

Note.—If the property rented is so intimately connected with property used in the company's telephone operations that the expenses on the former cannot be ascertained, they should be included in the operating expenses and the revenue should be credited to account No. 505, "Minor Rents of Exchange Plant;" No. 515, "Minor Rents of Toll Plant," or No. 524, "Rents from Other Operating Property," as may be appropriate.

321. Miscellaneous Non-Operating Expense.

This account should include all expenses in connection with non-operating revenue other than the expense provided for in account No. 320, "Rent Expense." This account should include all expenses in connection with procuring interest revenue, dividend revnue, profits from operations of others, and analogous items. It does not include the taxes on such investments.

322. Non-Operating Taxes.

This account should include all taxes payable by the company accrued upon non-operating property and all taxes assignable to non-operating revenues. (See Sec. 16.)

323. Uncollectible Non-Operating Revenues.

When any non-operating revenues are judged by the company to be uncollectible, the amount thereof should be credited to the account in which theretofore charged and charged to this account.

IV. Deductions from Gross Income.

330. Rent Deductions for Lease of Telephone Plant.

This account should include all amounts accrued against the company for rent of telephone plant and equipment which it holds under some form of lease from another, and of which for operating purposes it has the exclusive possession.

This account is intended to cover only rents payable for the use of telephone exchanges or operating units held as a whole under some form of lease.

331. Rent Deductions for Telephone Offices.

This account should include the rents payable accruing for use of general offices and central and branch telephone offices owned by others, exepting rents for which provisions are hereinafter made under "Clearing accounts."

Note.—Where rent payments cover services, light, heat, etc., and maintenance, in addition to a return upon investment, an apportionment should be made of the rent payment and the amount representing interest and maintenance (estimated, if not known) should be charged to this account, the balance of the payment being charged to the appropriate expense accounts. Where repairs of rented buildings are made by the company, the cost of

such repairs should be charged to the appropriate operating expense or other accounts.

332. Rent Deductions for Conduits, Poles and Other Supports.
This account should include the rents payable accruing for the use of ducts, conduits, or subways owned by others and rents for the use of poles, fences, or buildings as supports for the telephone lines of the accounting company.

333. Rent Deductions for Instruments and Equipment.
This account should include the rents payable accruing for telephone instruments and equipment owned by others.

This account does not include amounts paid licensor telephone companies under an agreement to pay a certain percentage of revenues for use of instruments, privilege of connection, etc.

334. Miscellaneous Rent Deductions.
This account should include rents payable accrued not provided for elsewhere.

Note.—Rent of tools, equipment, or other facilities used for construction should not be included in this account, but in the appropriate fixed capital account.

335. Interest Deductions for Funded Debt.
This account should include all interest accrued on outstanding funded debt and debenture stock issued or assumed by the company. This account does not include interest on securities held by the company in its treasury, in sinking or other reserve funds, or pledged as collateral.

Note A.—Interest accruing on funded securities after maturity should not be included in this account, but in account No. 336, "Other Interest Deductions."

Note B.—If any of the funded debt securities issued or assumed by the company are held in its sinking or other reserve funds, and the interest on such funded debt is an accretion to the fund, the interest on such securities should not be charged to this account, but an amount equal to the interest on the funded debt so held should be charged to account No. 350, "Appropriations of Income to Sinking and Other Reserve Funds." This does not apply to securities carried in account No. 127, "Provident Fund Assets."

336. Other Interest Deductions.
This account should include all interest accrued on unfunded debt, such as short-term notes payable on demand or having dates of maturity one year or less from date of issue, and open accounts and other analogous items, including discount on short-term notes; also interest accruing on funded debt securities after maturity of debt.

337. Loss on Operating of Others.
Whenever, in accordance with the terms of any contract, the company is bound to contribute toward reimbursement of the losses resulting from the operations of others, all liabilities against the company accruing from such source should be charged to this account.

338. Amortization of Debt Discount and Expense.
Charge to this account during each fiscal period the proportion of the unamortized discount and expense on outstanding funded debt which is applicable to the period. (See sec. 7.)

339. Release of Premiums on Debt—Cr.
Credit to this account during each fiscal period the proportion of the premium at which outstanding funded debt was issued which is applicable to the period. (See sec. 7.)

(To be continued.)

Telephone Company Outlawed in Denver.

At a recent special election in Denver, Colo., an ordinance was passed declaring the Mountain States Telephone & Telegraph Co. an outlaw on Denver streets and alleys. Rates were established for unlimited, measured service and residence telephones, and the telephone company is required to apply within a limited time for a franchise.

Montana Company to Expand.

The Meagher County Telephone Co., of Harlowton, Mont., at its recent annual meeting, voted to increase the capital stock to $25,000 and to expend $2,000 in extending the local plant and toll lines. The following officers were elected: F. W. Barron, of Harlowton, president and general manager; E. T. Barron, of Roundup, vice-president and treasurer; and Benj. Urner, of Harlowton, secretary.

Practical Telephony for the Practical Exchange Manager

A Series of Articles Relating to the Construction, Maintenance and Operation of a Moderate Size Telephone Exchange, Which Began in the Issue of September 21, Expressed in Everyday Terms, Easily Understood—Principles Easily Applied

By H. R. Van Deventer

No attempt has been made in this series of articles, to cover in detail all phases of construction work, but rather to point out some general lines of procedure, leaving details to be obtained from the books now available on the subject.

As a preliminary study of ordinary construction work, the hand books and catalogs furnished by various telephone manufacturing companies are available. The Kellogg, Dean and Stromberg-Carlson companies have been noticeably progressive in supplying booklets of this character. The Western Electric bulletins, Nos. 1019 and 1012, relating to line tests and small board installations, are of interest as showing the methods approved for use with the so-called "Bell" apparatus. Practically all manufacturers issue valuable booklets relating to their instrument constructions and circuits.

"Telephone Principles and Practice" by Wilder is a good book for the beginner, as it contains simple data as to fundamental theory, and simple construction; see also "ABC of the Telephone" by Homan. The "Practical Telephone Handbook" by Poole is interesting to those who may want to know something of English methods. Being a British book, it does not contain much practical American data. The books on telephony forming part of the engineering course of the International Correspondence School, Scranton, Pa., and the American School of Correspondence, Chicago, are comprehensive works of general value, somewhat lacking in descriptive matter of modern equipment, but valuable to the student of theory of design. It is well when reading such books to have several manufacturers' catalogs at hand, and compare the actual instrument with the theoretical circuit or structure from which it has been developed as shown in the text book.

"Telephony" by Abbott is complete in six volumes, each book devoted to a particular branch such as instruments, switch-

boards, central office location, traffic, etc. Owing to the death of the author these books have not been revised in several years, so are not descriptive of modern apparatus, but are exceedingly valuable to one studying the principles of practical apparatus design especially Volume Five. "American Telephone Practice" by Miller is complete in one volume and no telephone library is complete without it. It is just what its title implies, a resumé of practical construction and operation. While particularly valuable to the engineer, the latest edition is indispensable to the average exchange manager, although a more detailed description of instrument troubles and repairs would be of value to those in the smaller exchanges.

"Telephonology" by VanDeventer is of particular value to those who wish practical information without theory or a study of the older methods and types of equipment. It is devoted to practical methods of trouble location and repairs, including phantom work and railway train dispatching.

"Toll Telephone Practice" by Thiess and Joy should be at hand as a valuable aid in understanding the circuits and methods used in toll or long distance work. This book also contains some valuable and heretofore unavailable data as to phantom transposing, etc.

For those who wish to study the behavior of the telephonic current, mathematically, "The Propagation of Electrical Currents in Telephone and Telegraph Conductors" by Fleming will be interesting, although works of this nature are too advanced for the average practical man.

A handbook of compact form is "Modern American Telephony" by Smith. The subjects are briefly treated, and the book is well illustrated. A good book to serve as an introduction to "Telephone Practice," "Telephonology," etc., is "Telephony" by McMeen & Miller, a large work of value along the lines of "American Telephone Practice." "Telephony" is practical and should form a part of the library.

These, together with a complete file of TELEPHONY, would comprise a very complete collection of telephone literature. Perhaps the larger companies would find "Telephone Construction Methods and Cost" by Mayer, valuable as an aid in estimating and computing costs. A copy of "Telephone Law" by McMillan will also be of value to any company. By consulting it, the necessary procedings when gettings rights of way, increasing capital stock, etc., may be ascertained probably better than by consultation with the average lawyer in the rural districts who is usually not well posted on such subjects.

For the wire chief who desires to become thoroughly familiar with all kinds of tests, in addition to the telephone books, "Electrical Testing," by Schneider, will be valuable; also all the catalogs of the makers of voltmeters and testing appliances, "Electrical Laboratory Notes" by Fleming, and "A Practical Guide to the Testing of Insulated Wires and Cables" by Webb, "A Handbook of Electrical Testing" by Kempe, "The Galvanometer and Its Uses" by Haskins, the recently issued "Methods of Measuring Electrical Resistance," by Northrup, and similar books.

Those who desire data from which to design apparatus, will not only study all of the books named, but in addition will read "Solenoids," by Underhill for information as to the design of windings, etc., Atkinson on "Electrical and Magnetic Calculations," "Experimental Engineering," by Carpenter, for tests of materials, etc. The publications of the United States Bureau of Standards as to magnetic testing, are also of value.

In some cases a careful review of the patent situation is necessary when purchasing equipment or developing apparatus. A matter of this kind would better be referred to some attorney making a specialty of telephone work, as there is no data available which would be of practical service. Should the desire be to find out what has been done along a certain line, no better way exists than to purchase the particular class or sub-class of patents relating to the particular article in question. Take a transmitter for instance, there are probably 400 transmitter patents. He who is in earnest will buy them all, at a cost of five cents each and will have before him the entire art. Of course a skilled attorney can make a search for a fraction of this cost but a separate search must be made for each new

A Well Stocked Book Shelf Should Be in Every Exchange.

idea, whereas, if the complete record is secured it is always at hand.

It should be remembered that books on electricity in general, or foreign works are of little value to the student of telephony. Methods of telephone line construction differ greatly from electrical power line work and foreign practice is different from American. A general electrical engineering work consists of details. The electrical handbooks, general knowledge is of little value to the telephone man. Telephone works and periodicals seldom contain these essential details, and their purchase is a waste of money as far as practical results are concerned. Of course the study of any book on electricity will aid the beginner to comprehend principles, but specific telephone knowledge is only obtained from books and papers devoted to telephony.

Federal Adds Eight Exchanges.

During the last two months eight exchanges have been added to the system of the Federal Telephone & Telegraph Co., of Buffalo, N. Y. They are located at Angola, Forestville, Silver Creek, North Collins, Montour Falls, Enfield, Newfield and Mecklenburg. With the exception of a few Bell pay stations scattered through this territory the Federal company is rendering to these communities exclusive service.

New Company at Galesburg, Illinois.

The Galesburg Utilities Co., of Galesburg, Ill., has been incorporated with a capital stock of $5,000 to do a general electric light, telephone and telegraph business. The incorporators are George B. Churchill, F. C. Woods and Lafayette Weinberg.

Gilmore Resigns from Illinois Clearing House.

H. B. Gilmore, who has been secretary and manager of the Illinois Toll Clearing Association for the past year and a half, resigned at a meeting of the board of directors of that organization held in Chicago on Wednesday. Mr. Gilmore will remain with the clearing house till the end of the month at which time some one will be appointed to take charge. Mr. Gilmore wishes to branch out on a little wider scale and states that he has several propositions under consideration.

Practical Subjects—Letters and Discussions

Has Anyone Dealt With a Like Situation?

I would like to have some of the problems that we have had, discussed and have the advice of those, if there be any, who have had similar experiences.

We have 325 stations charging for business telephones $1.50, residence $1 per month and connectional contracts that give our subscribers free service to approximately 1,600 telephones. Of our residence telephones, 125 are rural. We build the lines, furnish the telephones and keep all the equipment up. We give continuous service, keeping an operator in the office at nights and all day Sundays. We have a new switchboard and standard types of telephones.

Last spring the farmers built an exchange in town, ran their lines in and forced some 20 of our rural subscribers to quit us. They passed a resolution that none of their people must patronize us and told the merchants that they must take their telephones or they would not trade with them.

They are trying to run their exchange at cost, but so far, as best we can learn, the payments do not meet the expenses and they will have to borrow money. We have offered to buy all their equipment and switch them for 25 cents per month, but they refuse to deal with us at all.

I would like advice as to whether our rates are too high, meaning what we charge our own subscribers and as to whether we had better just let them work out their own problem. Our town exchange is steadily growing and we have good toll business.

M. Collier, Secy.,
Prairie Grove, Ark. Prairie Grove Tel. Co.,

Operating Efficiency Clocks.

An efficiency clock as shown in the illustration has been designed by traffic supervisor C. G. Tatnall, for use in the four central offices of the West Philadelphia District, including Baring, Belmont, Preston and Woodland, says Paul Nicholadsé in the Telephone News.

The clocks are thirty inches in diameter. The dials are

The Efficiency Record Clock.

divided into "one hundred minutes," in groups of five, and the four central offices are represented by four movable hands of different colors. These hands are set every morning at the efficiency figure for the current week prior to the preceding day.

Efficiency figures are obtained from service observations. The efficiency rating is based on six factors, each of which is assigned a certain number of points as follows:

Errors	30 points
Answers requiring over 10 seconds	20 "
Disconnections requiring over 8 seconds	15 "
Answers to recall signals	15 "
Voluntary supervision	10 "
Operating irregularities	10 "

If the observations disclose a perfect rank in each one of these facts, the rate is 100 per cent. If they should disclose an error of 5 per cent. or more in each factor, the rating is zero. Between the perfect score and the 5 per cent. error, a sliding scale has been arranged which provides a rating inversely proportional to the amount of error.

The clock pictured above shows the actual record for the week ending December 6, 1912. The standing of the different central offices shown by the clock is as follows:

Woodland	83.1
Belmont	73.6
Preston	70.1
Baring	69.3

The comparative efficiency of each office in the district is clearly indicated by these clocks, and a keen interest is displayed by the operating force in the standing of its particular office.

The Switchboard Girl Writes Her Aunt.

THE DEBUT OF THE TELEPHONE COMPANY.

My Dear Aunt:

You remarked upon the tired lines shown in my face from the last photograph I sent to you. The switchboard life does wear on a girl's nerves, even though we try to keep our voices from showing it. The bright days show us, when we have time to glance through the window, groups of gay girls and happy women going and coming from their many forms of afternoon entertainment. The church services, the Eastern Star tea, the high school fair and—you know them all.

As one after another of these acquaintances call through my board in a flurry of haste, with accent harsh, or suspicious of my good intentions, you know how the spirits sink. Bitter thoughts almost get the start of me, but one day while fighting them back an inspiration came to me.

You remember the professor who advised me once that it might be better in a certain undertaking not to try than to try and fail? You at once gave me this lifelong recipe of yours:

"If you've won on lower plane,
Try again!
Life is more than one campaign,
Try again!
Send your guidons to the fore,
Strive to seize one standard more,
Still ungained are palms galore,
Try again!"

And I began working on my idea. I need not tell you how many discouragements I met; how much cold water was thrown on my attempts, but at last I was made happy by one of the most successful little entertainments our town has had for a good many months. And this is how it came about.

I got to thinking at short intervals why we, the most important business element in the town, were so much misunderstood. And I soon came to a conclusion about that. Because not one in 50, to say the least, realizes for a moment what "Central" has to do. Then, as my idea began to take form I thought of an informal afternoon reception for our com-

pany. My, the ideas began to fall over one another, and I could hardly wait to talk it over with some one.

In a lull of business I called the manager's wife, who lived on a street on my way home, and made an "Apt. a. m." The next day I broached the subject to her. She was an ex-"Central," so the heard my plan with sympathy. We called in the other women connected with the work and appointed a committee meeting of all those interested.

The president's wife was an excellent public reader; the president just the man to give a short address. The manager, who was the leader of the newly organized band, would see about the musical numbers; the treasurer and lineman of the company were members of the band also, so we were sure to have their help. We had in all, not counting the men, eight women and girls interested in the affair, besides four little girls for waitresses.

Well, you have arranged enough programs to know that it took some time to arrange this one and get it into working order, made up, as it was, of the busiest people in the town:

Music, Band.

Address, "The Beginning of the Telephone Business in Our City," The president.

Reading, Wife of the president.

Cornet Solo, The manager.

Vocal Solo, The wife of manager.

Music.

"Ups and Downs of a Lineman's Life," The Lineman.

Music.

Refreshments.

Host and hostess for the afternoon, The treasurer and his wife.

Preparations by the committee on decoration began early one Thursday morning. The office, office bedroom, hall and stairway were given a spring cleaning. The bedroom fixtures were removed to the flat roof of an adjoining building. A large rug was laid in the room that was to be used as a reception room. The band was to have seats arranged in the hall. The bowl for the fruit punch was placed upon the table, with stacks of wafers around it. The little girls were to be the helpers. Badges had been procured, so that every one connected with the company work might wear one.

An invitation to the patrons of the line in town and country had been extended through the local paper, and in other ways, so that none might be slighted, and then, Auntie, it was time for the "Centrals" to get into their "royal robes." You may be sure we felt that nothing was too good for this, our first appearance at a social function with our whole family.

Promptly at 3 o'clock, the hour for beginning, the band, stationed at the foot of the stairs, gave the first number on the program. From that time on, till the close of the affair, the ushers were kept busy moving the guests through the office and into the reception room. The girls took turns at the busy board and listened, it must be confessed, with delight to the remarks of visitors.

One good-natured doctor said: "If I had to run that board I would take the whole thing up and pitch it through the window!"

We ran one scene especially for the rural subscribers. The host left his place beside his wife and went to the board. For about 15 minutes he demonstrated how he collected the quarterly rural tolls. He takes one side of the board during the busiest evening hour. Calls Mr. Kimball on 119. He knows the line's sure busy. "Central, how many rings for Kimball?" "Three." "All right St. Joe, party N. H." "June, what line is Gazley?" "There, Mrs. Gazley? How are you? All well? Good. Where is Herb? Not at home? This is Harry Miller. Yes, we are all well, thank you. Just wanted to tell you I'll be along there tomorrow forenoon. He'll know what I want. Good-bye." ("Have to tell them, or walk across two or three miles of ploughed ground to get to him when I do go.")

Maybe two hours of this doesn't wear on my nerves! Next quarter the rural people assured me, on the quiet, while I served them refreshments, that they would sure try to get their rentals in on time. This was only one of the inside annoyances that was diminished.

The results of that meeting did not end with the pleasure every one expressed in the event. It would take a longer letter than this to tell of the effects on "Central's" work-a-day life. The best of it is, they have voted it an annual affair. And, don't you see, we may show yet more gain and progress for our company next year? We must study in every way to increase the service for good. I am so glad I thought of the mutual interest reception. Yours, lovingly,

JUNE.

An Unusual Extension Telephone Trouble.

Am sending a diagram of a case of trouble that had us puzzled for a couple of days. We have a Monarch bridging desk set in the main office of the high school, also an extension telephone in the superintendent's office. A buzzer is placed in the superintendent's office and a push button in the main office controls it. The wiring is done with triplex, using the third wire and one side of the line for the buzzer circuit.

The trouble reported was that the buzzer at the extension telephone would begin to ring unexpectedly without any one in the main office pushing the button. It would just as suddenly stop without any one being near the button. Part of the time it was reported that the trouble could be stopped by working the hook on the main telephone. The buzzer was liable to work at any time and, as the superintendent's room was used part of the time for a class room, it naturally created some disturbance. The troubleman would always find everything O. K. when he arrived. This happened two or three times, so finally I thought I would try my luck at solving the puzzle and this is what I found:

The battery for the telephone and the battery for the buzzer were all under a desk in the main office, also a wire waste basket. Whenever the waste basket was moved right, it would cause a cross between the buzzer battery and the telephone battery, as shown in the diagram.

I have left out all wires that were not necessary to show how the trouble was caused. As will be seen by the sketch, the buzzer would stop when the receiver was removed from the hook. This generally cleared the trouble, because the person

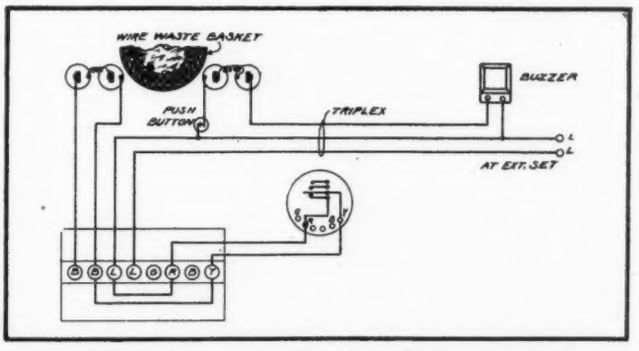


Diagram Showing How Buzzer Circuit Was Closed.

at the desk would nearly always move his basket enough to clear the trouble when reaching for the desk stand. This is the first cross I ever found caused by a waste-paper basket, although I found one on a toll line lead caused by an iron frying pan, thrown by some one who had more time than brains.

R. L. Cline, Wire Chief,
Carthage, Mo. Home Telephone Co.

Out of the Mail Bag

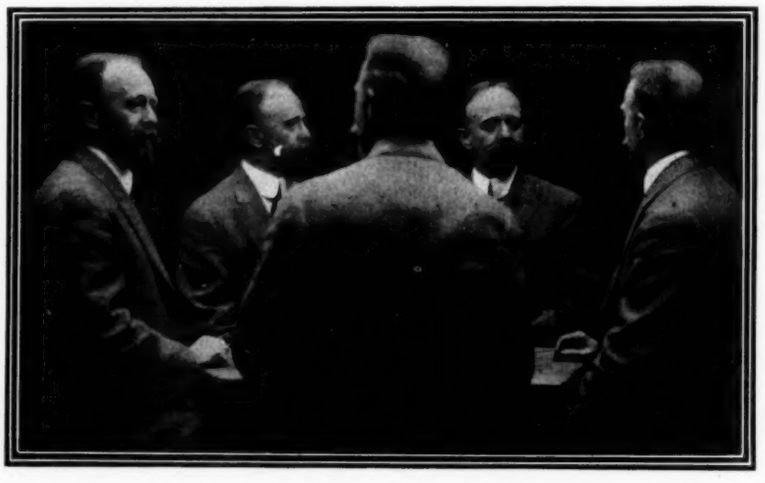
Well, it's over. The 1913 National Independent Telephone convention has been held and notwithstanding all the war rumors the association finished its business and adjourned without loss of life or limb. The "dead" and "wounded" lists were negligible. There were some reported "missing," but history records that many men lost have turned up sooner or later, alive and well, and able to cause relatives and friends all kinds of trouble.

With the convention over, the next big event is the inauguration of President-elect Wilson, and when that is accomplished the country can settle down for the year's work.

All signs point to a memorable year. Business conditions are favorable—always providing that the tariff tinkering does not upset things—and there is a great deal of building and construction work going on. Incidentally, there is a big mining project afoot, which is of interest to telephone men generally. We refer to the Interstate Commerce Commission in its great act of digging into the American T. & T. for facts and figures relative to the telephone situation. If that commission does as good work in the telephone field as it has in the railroad field it will be a good thing for everybody—especially the public and the Independent companies. So here's hoping their mining operations are successful.

L. H. Roberts, secretary and manager of the DeKalb County Telephone Co., of Maysville, Mo., is an old subscriber to TELEPHONY, and we believe him to be a good friend of the paper. Here's a letter from him:

"I have been a subscriber to TELEPHONY, commencing with Vol. 1, No. 1, at South McAlester, Okla., Plattsburg, Mo., Stewartsville, Mo., and now at Maysville, Mo. It has been worth hundreds of thousands of dollars to the telephone interests of the country, a teacher to thousands of young linemen, a systematizer to the office force, an inspiration to the manager, a safe guide to the careful investor and an eye opener to the general public as to the telephone industry. May the subscription list of TELEPHONY double during the New Year is the wish of Yours Truly, L. H. Roberts."



J. F. Tompkins is the "Whole Thing" in This Group, as He Usually Is in Any Other.

Herewith is shown an odd photograph of J. F. Tompkins, general sales manager for Frank B. Cook, which he sent TELEPHONY from New York. It is not a moving picture of Mr. Tompkins, but enables his friends to see him in different poses. The idea of combining several "sittings" on one card should appeal to those who have suffered the annoyance of selecting one to be "finished up," only to find that the one chosen doesn't please everybody. If the recipient of a photograph isn't satisfied with at least one out of the five submitted he is certainly hard to please. We are not quite certain whether Mr. Tompkins, who does not usually "flock by himself," is holding an executive session, or playing poker, or canvassing the prospects of a big year for Frank B. Cook, but he certainly makes a striking and interested appearing group.

"Herewith I hand you check to cover my subscription to TELEPHONY," writes C. G. Fitzsimmons, vice-president and general manager of the Reading Central Telephone Co., of Reading, Mich. "You may know I like your paper very much or I would not have taken it all this time. It is surely worth the money." Mr. Fitzsimmons is deservedly proud of the fact that out of a population of 1,012 in the community his company has 483 telephones in service, making an average of fewer than four persons to a station. With good grounds he claims this is the highest development of any place in the United States. Think of it! The same development all over the country would give the United States over 24,000,000 telephones!

Writing us from Nelson Lane, England, Thomas Hargreaves, who is connected with the British Post Office Telephone Service, says: "Last year, if you remember, I suggested more articles of a technical and practical nature in TELEPHONY than you had been giving, as being of more use to your readers over here. This year I must congratulate you in your efforts and the various splendid articles you have had on all phases of the telephone work."

W. Jackson Bell very appropriately lives at Friendship, Wis., and his letter of renewal certainly shows that he is imbued with the atmosphere that belongs to a town of that name. "TELEPHONY," he writes, "is, of course, a part and parcel of the telephone business, and I assure you that it would not be my wish to have it stopped."

In a letter enclosing check for his subscription, C. B. Sundberg, manager of the Dallas (Ore.) Telephone Co., says: "TELEPHONY is getting better every year and I would be lost without it."

F. L. Whitaker, of Etna Green, Ind., writes under date of January 27: "Please inform me if H. R. VanDeventer's articles now appearing in TELEPHONY are published in book form. If so I would like to secure a copy as these articles are most valuable and interesting in their line. 'Uncle Dick's' letters also contain some valuable advice to new men. Such information, if brought into every exchange, would do a great deal of good. Men just starting in telephone work appreciate material of this nature."

"I find that TELEPHONY is steadily improving," writes E. D. Selmser, of Houston, Texas, in an interesting letter giving news of telephone happenings in the Lone Star state. "The Kelsey articles are right to the point. I always read his stuff first and I certainly enjoy them and hope I will have the pleasure of reading them for a long time to come. The revised 'Inspector and Troubleman,' by Dobbs, is O. K. I had his first book and always enjoy reading such articles. I hope you can have more telephone stories of the same order. VanDeventer's articles are also good. I always look for the arrival of TELEPHONY."

"We are more than pleased with TELEPHONY," writes R. L. Maurer, of Brattain & Maurer, proprietors of the Batesville (Ind.) Telephone Co.

Troy R. Howell of the Harris (Mo.) Telephone Co. in a letter making remittance for his subscription, writes: "I like your paper very much."

From Factory and Salesroom

Conventions: Iowa Assn., Des Moines, March 11, 12, 13; N. Dakota Assn., Valley City, March 11, 12

To Speed Collections and Correct Service Mistakes.

By R. N. Fellows, Addressograph Co., Chicago.

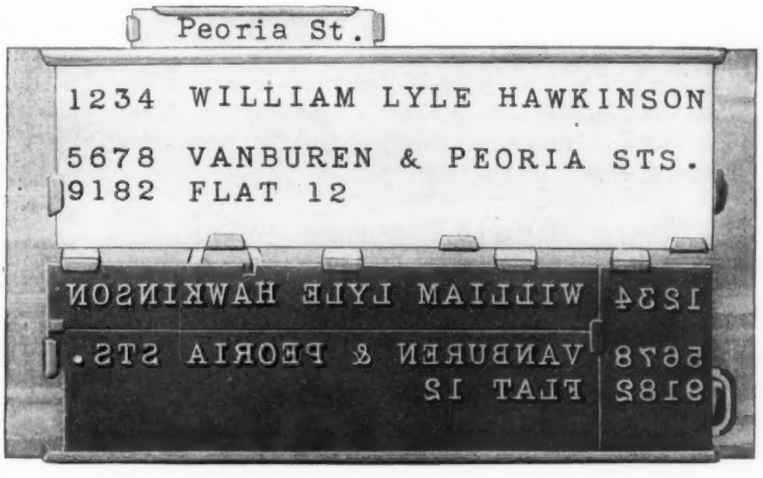
"My work is only half finished when I give our subscribers good telephone service," stated the manager of a medium sized exchange to me the other day. "I must next collect my money."

While these two features, "service" and "collection for service rendered," are present in almost every business, they loom up most formidably in the telephone business. There is hardly a more exasperating thing than poor service. Again there is nothing so vital in the business as the prompt monthly collection of money. Therefore, any system that tends to create better telephone service for the subscriber and speed the payment of money to the telephone company is bound to increase profits.

This brings us to the fundamental requirement necessary to accomplish these ends. An accurate list of subscribers' names and addresses is necessary in every telephone office. Unfortunately not every manager has the proper method for keeping his customers' list accurately up to date. As a result he experiences complaints from customers and more or less embarrassment from the fact that his collections are delayed. Six hundred and thirty-three telephone managers, however, collect their money almost automatically each month. By means of their office boy and a simple system, they are also able to learn about many little minor mistakes in connection with their service. Then by reviewing these little service errors, they are able to make many corrections and improvements in their service each month and better satisfy their subscribers. The system employed by these 633 managers is very simple and inexpensive. It proves equally profitable for large and for small exchanges. All there is to it is a combination reference card and an automatic typewriter style printing arrangement. The cards permit keeping right on the address plate information regarding party line service—whether collections are paid promptly or not—toll patronage and a dozen other little items of interest to every manager. These cards are equipped with subdividing tabs of any style or nature and are then arranged in the desired card index order in labeled filing drawers. This makes it simple for the office boy or girl to make changes and additions, as the printing part of the card is made in separate sections so that a name can be removed and interchanged into another card without disturbing the rate or address portion. The office boy or girl empties these cards into a simple machine each month and addresses and dates the bills in duplicate. As it is an impossibility to skip the printing of an address or a bill or make a mistake, and as the work is handled in less than an hour each month, the bills go out promptly and are promptly delivered to the subscribers. By means of discount privileges which some of these companies give, subscribers pay their bills within two or three days of their receipt. The advantages of this automatic method is that the work is handled with dispatch, economy and accuracy. The bookkeeper or office girl does not spend four or five days each month in addressing a list, skip names, make mistakes and cause confusion.

The particular cards have a second feature of great importance to every telephone manager. A manager who started using this system told me that it all started with a particularly grouchy subscriber of his. He was constantly calling up and complaining about his telephone. So the manager made it a point to have his operator call up this old gentleman occasionally and make sure that he was getting satisfactory service. He changed the formerly dissatisfied customer into a good booster for the company. Then he realized what a good idea it would be to keep in touch with all of his subscribers in this manner. But, as his exchange operator was kept busy with regular calls, it woud not be systematic nor practical to have her call up the customers. More than this a good many of the customers, especially in the business district, would be particularly busy, and a girl calling up and asking about service would not be nearly as impressive as a good "straight-to-the-mark" personal letter or neatly printed card.

Therefore, each month this manager—and the idea has spread into many other telephone offices—sends out to his list of subscribers by means of these addressed cards, little personal notices asking his subscriber if the service is perfectly satisfactory. In this way he has secured several valuable letters from business men, women subscribers, etc., which have given him many money-making hints for improving his service. By means of these suggestions he has corrected many little annoying evils; they have enabled him to greatly perfect his service and thus make the payment of monthly bills a much more cheerful proposition. A good many of these managers have not confined their activities to the people who are already their subscribers. They use the same cards for systematically following up a list of people who should have telephones. They find this direct method much more profitable than general newspaper advertising. The "direct-by-mail" method is proving particularly valuable for selling telephone service because of its many features of advantage.



Combination Record Card and Automatic Printing Arrangement.

A telephone manager in Ohio had received several good letters regarding his service from prominent business houses and prominent people in the residential district. He had these letters reproduced by an inexpensive method, got up a few printed circulars and sent them out to a list of people he knew to be good prospects for telephones. He did not stop with several letters or circulars, however, but kept after these people with some good logical facts about the value of a telephone. Space does not

permit me to explain in detail this particular telephone manager's follow-up. I shall, however, be glad to explain in detail to any manager who cares to write me about it. There is no question but that any manager of a company, whether large or small, can very profitably compile a list of the names of people in his town who should have telephones, and send to these people some "straight-to-the-mark" reasons for installing telephones. Make it a point to keep your important subscribers' list accurately up to date. Try to get some automatic method for handling your changes and additions—so that you can be assured that the clerk in your office is actually keeping this important record in your business in perfect condition at all times. Investigate improved office methods for automatically speeding collections. Get in touch with other telephone companies and investigate their systems and automatic methods in their auditing departments.

The ideas you obtain in this way will mean hundreds of dollars to you in a few years. They will enable you to get in your money promptly. They will enable you to keep in touch with your subscribers and correct those annoying service errors that constantly arise. Instead of dissatisfied and complaining subscribers, you will have an enthusiastic throng of boosters—the most valuable advertising asset you can have. The same automatic system that will produce this result for you will also enable you to get in your collections more promptly. At the same time you can conveniently follow up those people who should use your telephone and by a combination of these automatic operations greatly increase your profits.

McMeen & Miller Incorporate.

The well known engineering firm of McMeen & Miller, of Chicago, which, for the past 10 years, has existed as a partnership between Samuel G. McMeen and Kempster B. Miller, has now been incorporated under the same name. The personnel of the new firm includes Mr. McMeen and Mr. Miller, the former partners, and as a new member, Leigh S. Keith, who, for a number of years, has been

Kempster B. Miller. Samuel G. McMeen.

connected with the firm in the capacity of managing engineer.

The incorporation of this firm comes as the result of its constantly widening field of operations. The old partnership was established, primarily, to conduct a general telephone engineering and patent expert practice. Mr. McMeen and Mr. Miller were the first engineers to establish themselves in a general telephone engineering business, detached from all manufacturing and operating concerns. The scope of the concern has rapidly widened, so that the

Leigh S. Keith.

greater bulk of the work of the firm for a number of years has been in the line of consultation, design, construction and management in connection with properties in the railway, light and power fields, and investigations of public service corporations for private and municipal interests.

Mr. McMeen, who is the senior member and vice-president of the new firm, is well known as one of the pioneer telephone men of the country, having served the Central Union Telephone Co. in all capacities, from operator to chief engineer. Later he had wide manufacturing experience with the Western Electric Co. and, since entering into partnership with Mr. Miller, has become well known as a designer and constructor, and as an executive of public service corporations. Among the more recent notable work done by Mr. McMeen might be mentioned the engineering, construction and subsequent executive management of the San Francisco Home Telephone Co., and his services as president of the Mount Hood Railway & Power Co., of Portland, Ore., during the later stages of its plant construction and previous to its consolidation with the Portland Railway, Light & Power Co.

He is at present located at Columbus, Ohio, where he is devoting practically his entire attention to the affairs of E. W. Clark & Co., of Philadelphia. He is president of the Columbus Railway & Light Co., one of the Clark properties, and has the executive management of all of the allied electric properties in Columbus. He also serves in an advisory capacity in the Clark properties throughout the country.

Mr. Miller, who is president of the new firm, is perhaps best known to the world as the author of "American Telephone Practice," for many years considered the standard treatise on telephony the world over. Mr. Miller, after graduating from Cornell, served a short apprenticeship in the lighting and power departments of the Thomson-Houston and Westinghouse factories, then entered the telephone manufacturing field in Chicago, and for many years was identified, as engineer and manager, with the Kellogg Switchboard & Supply Co.

Since entering the field of general consulting engineering his talents have been directed to a wide variety of works.

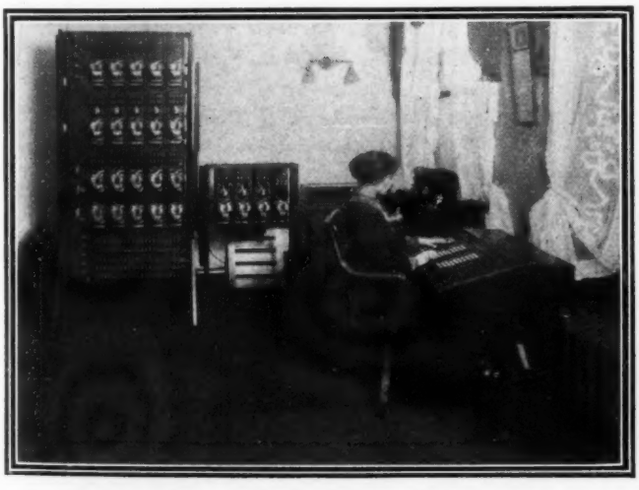
some of them of notable importance. He has devoted much of his attention to special investigations of public utilities, both from the engineering and financial standpoints. He is general manager of the Central Oregon Power Co. and is at present devoting much attention to the development of hydro-electric projects on the Deschutes River, in Oregon. He is also acting as consulting engineer on special problems for a number of electric railways, light and power companies, particularly specializing, in this connection, on the subject of electrolysis of underground structures.

Leigh S. Keith, secretary and treasurer of the new firm, is a graduate of the Massachusetts Institute of Technology. For a number of years he was employed in the engineering department of the New York Telephone Co., the later years of this service being spent in the making of special investigations directly under the chief engineer. About four years ago he entered the employ of McMeen & Miller, and has been engaged in a wide variety of engineering work, particularly relating to public service investigations of light, power and telephone properties, and various special problems in the field of electric railway work, such as the location of substations, the design of feeder systems and the prevention of electrolysis. For the past three years he has been managing engineer of the firm, so that in becoming one of the principals the change involved is more of name than of function.

The organization of the company has been increased so as to include a full corps of experienced engineers fitted in every way to handle properly, not only the general work of a consulting engineering business, but also the more specialized details of economical and efficient design and construction of steam or hydro-electric stations, high tension transmission lines, and overhead and underground distribution systems.

The Blind Operator of the Automanual.

Accompanying is a photograph of Miss Clara Pearson, mentioned in TELEPHONY last week as the young woman who put through calls at the Telephone Improvement Company's exhibit, at the La Salle Hotel, Chicago, at the rate of 1,000 per hour, on the Automanual switchboard. Miss Pearson is totally blind and her dexterity is obtained through the "touch method"



Miss Pearson, the Blind Automanual Operator.

of handling the keyboard after the manner many stenographers use in their typewriting.

Miss Pearson's work on the Automanual keyboard, it is urged by the North people, demonstrates the superiority of that system over others. Operators on manual boards, it is pointed out, must have good eyesight, good hearing and good health generally. Eyesight is an absolute requisite in order that the operator may readily find the subscriber's number on the multiple. The fact of Miss Pearson being able to handle calls at such a high rate of speed is cited as illustrating how completely mechanical accuracy has supplanted, in the Automanual, the more or less varying accuracy of the operator in manual work.

The constant repetition of a certain mechanical action, it is declared, will in time lose force and accuracy when performed by hand. The tendency of modern practice is to have as many as possible of such actions performed by mechanical means, which never vary. This, it is stated, constitutes one of the strong arguments for the North system, in which every action possible is handled mechanically, leaving only those which require a distinct exercise of intelligence to be done by hand.

The Reinforcer Is Among Us!

The Reinforcer, declared to be devoted to "periodical pole line progress," is the name of a handsome booklet issued by the Pittsburgh Reinforcing Co., of Pittsburgh, Pa. The Reinforcer, which it is proposed to print and distribute once a month, is about the size of Elbert Hubbard's Philistine, and the first issue contains almost as many good things as the periodical of the great Fra.

Typographically it is a joy to the eye; the paper is excellent and the illustrations fine. The cover design is distinctive and striking, showing a pole (obviously reinforced by the Pittsburgh process), done in black, on a background of orange. The name of the paper is in white, the index panel being also in black and white.

W. A. McCombs, the company's sales manager, familiarly known as "Billy," is the editor, and he has unquestionably distinguished himself in Vol. 1, No. 1. If he can keep up the gait he should shortly acquire a large and influential list of steady readers. After a witty salutation to the trade, in which he says interesting things in a manner peculiarly his own and particularly pleasing to everybody, Mr. McCombs proceeds to hand out a lot of "good stuff"—practical stuff, most of it, but well interlarded with a lively humor. In the rear of the procession comes an article on the importance of pole inspection, accompanied by tables showing the real strength of poles with hollow hearts, exposed pockets, etc. And on the back cover is the declaration, whether founded upon experience or not TELEPHONY does not venture to state: "It isn't half as much fun being a four-flusher today as it was fifteen years ago. Everybody seems to have hiked over into Missouri."

However, more power to the Reinforcer, "Billy" McCombs, and to you, too! TELEPHONY wishes you both well, and, incidentally, advises its readers to make an early and special effort to get on the mailing list of the new periodical.

Book Reviews.

METHODS OF MEASURING ELECTRICAL RESISTANCE. By Edwin F. Northrup, Ph. D. Published by McGraw-Hill Book Co., New York, 390 pages, 6 in. by 9 in., with illustrations. Price, $4.

Dr. Northrup, professor of physics at Princeton University, is well qualified to write a book on methods of measuring electrical resistance, having been engaged for over 20 years in electrical measurement.

The book contains fifteen chapters which fully describe most of the many methods of measuring resistance. A selection has been made of methods which are useful for commercial tests and measurements. The measurements used in the illustrative examples are real and not assumed and were made under conditions usually met with in practice.

The first chapter deals with the extent, character and precision of measurements and considers the rules for the estimating of errors.

The chapters on the Wheatstone bridge explain the network of the bridge and describes the various slide wire bridges and their uses. The various bridge methods and arrangements of the resistances are shown together with suggestions for their use.

Other chapters take up the measurements of high and low resistances and instruments and methods used.

A chapter of special interest to telephone men is one on principles of fault locations. The various problems which arise are considered and the relation of principles to practice are shown.

In this chapter are first defined the various faults which occur on land lines. Problems and tests which are taken up in this chapter include the following:

The identification of the faulty wires.

The determination of the resistance of conductor loops.

The location, in distance, from a station, of grounds, crosses, opens, or inductive crosses on telephone or telegraph lines.

Fault locations when loops are made up of wire of different sizes and lengths.

Insulation resistance tests of installed or uninstalled cables. Here either the insulation may be defective in particular places or the defective insulation may be distributed along the conductor.

The location of grounds or crosses in heavy power cables requiring special apparatus.

The location of grounds or crosses in very heavy short underground cables. A special method is here required.

Location of grounds or crosses in high tension cables which are subject to inductive disturbances from parallel alternating current lines.

Another chapter deals with methods of measuring temperature by the measurement of resistance. Instruments for measuring for resistances and the principles involved are discussed. There is also a chapter which discusses deflection instruments and galvanometers.

The appendix contains considerable data applicable in measuring work.

While measuring resistances always require formulas, these are given in the forms which are used in practical work and the many examples show their applications.

WIRELESS TELEGRAPHY AND TELEPHONY. By Alfred P. Morgan. Published by the Norman W. Henley Publishing Co., New York, 154 pages, 5 in. by 7¼ in., 156 illustrations. Price $1.

As stated on the title page the book treats of wireless telegraphy in a simple manner. It takes up the explanations of the theory of modern radio equipment and its application in a popular manner so that the non-technical reader can readily grasp the ideas. Mechanical analogies are used to illustrate the action of the apparatus and the theory involved. Three chapters are devoted to wireless telephony including its fundamental principles.

Paragraphs.

THE SPECIALTY DEVICE CO., formerly at 120 Opera Place, Cincinnati, Ohio, has removed to 112 W. Third St.

THE DUPLEX METALS CO., Chester, Pa., has a new folder, with a drawing of a "Weary Waffles" sawing wood industriously, meanwhile keeping one eye on two pies close by. The caption declares that "every little movement has a meaning all its own." "sawing wood and saying little was our specialty in the old days," says the company, for we knew that an actual trial of our wire would overcome all doubt or prejudice."

Johns-Manville Annual Salesmen's Conventions.

Following a long established custom, the 600 or more salesmen, as well as the department managers, of the H. W. Johns-Manville Co., assembled in annual convention on various dates from January 2 to February 8, at Milwaukee, Boston, New York, Philadelphia, Pittsburgh, Cleveland, Chicago, St. Louis, New Orleans, San Francisco and Toronto, to learn more about the products which they sell.

One by one about 300 products of this concern were taken up and their advantages over competitive products pointed out to the salesmen by specialists in each line. A week's time was devoted to each of these conventions, with a banquet at the close as a fitting ending.

Two American Telephone Fire Alarm Letters.

It has been granted for many years that TELEPHONY has the power to produce all kinds of inquiries, some from the most remote portions of the globe. The two communications here reproduced appear to offer new evidence to this effect. One is from the states (name and location omitted): the other from far away Bombay, India.

I have got the Patent of an Automatic Fire Alarm which I have Invented and which I would like to sell my right to some firm or Manufacturer who would like to buy my right cheap.

I am in the grain Business and can not make these Alarms Myself as I rather sell my right.

This Automatic Fire Alarm is simple and works very good, and [redacted], and it do not cost much to make the same, this Alarm will save a house from burning, because one Instrument is put in every room ina house, and a bell put in one room where a person stays most of the time and if one room is on fire this bell will ring and the Number of the Room where the fire is in will show in the room where the bell is [redacted], so the house can be saved at once, and the fire can be killed at once.

This Alarm can be sold to every house in a city the first thing.

Please write me at once and I will send you a ### Drawing of this Instrument or Alarm, and how it works, and how it is put up in a house, and how made.

If you will buy my right to this Alarm I will sell it to you right, and it will be a furtune for you I know.

This Man Offers a Big Opportunity.

Hughes Road, Chowpaty;
Bombay 30.11.12

Dear Sirs,

Kindly send me full literature photos, sketches catalogue & price-list of your Fire Alarm Boxes & other if really useful efficacious & cheap, I want to introduce same in India to our mutual benefit. Kindly send me lowest price including packing and f-o-b-New York?

In what cities is it used & with what success?

India is a very large field to buy such articles on a very large scale.

Kindly state what maximum discount you will offer me for trade money always sent with order. Can you send one for experimental purposes gratis & free with all instructions. With kindest regards. Yours truly

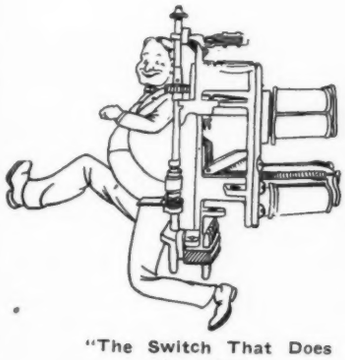
K.R.Vacha L.C.E.

There Might Be Millions in This.

The Cow.

The Pleased Stockholder.

"Director All Serene."



"The Switch That Does the Work."

The Manager.

The "Operator Once Forlorn."

"To Beat the Turk."

All of which goes to show, as the American Telephone Fire Alarm Co., of Chicago, has discovered, that, if you want to reach telephone people, TELEPHONY's columns offer the one best medium.

Parodies "The House That Jack Built."

The Telephone Improvement Co., of Chicago, as stated last week's issue, presented every guest at the banquet of the national convention, a paper knife. With each knife there went a jingle modeled on the order of "The House That Jack Built," and embellished with pen and ink drawing, the latter the work of Finney Briggs, a well known Chicago cartoonist. Following is the last verse, being an accumulation of the lines which preceded it, with several of the illustrations:

"This is the cow that wears the bell
That's seen now grazing in the dell,
Astonished at the difficult crosses
And changes and losses and many new bosses,
Under the shield by the Automanual way;
But from Boston to New York in envy did say:
'See the pleased stockholder.
Who has grown much bolder.'
And surely there can be no blame
'Service' made 'Universal' wane.
He told the director all serene,
Who saw the difference twixt milk and cream,
Passing dividends around,
That make the stock raise with a bound;
Pleasing the manager with shave and shine;
Who solved his problems just in time,
And sings his praises to the chime
'Automanual for mine'—
With fine operators once forlorn
Who now press buttons both night and morn,
That give service aristocratic,
That quenches thirst for automatic,
When using the switch that does the work,
That's built for war to beat the Turk,
That's made in the factory complete,
Manufacturing equipment that can't be beat
That is used in the exchange that Jack built."

The paper knife, which was described last week, was one of the handsomest souvenirs of the convention.

Protecting Exposed Metal Work in Battery Rooms.

It is quite essential that no metal work in the battery room, especially over the cells, be exposed to the action of the acid fumes and gases. The structural iron work of the building can be very well protected by encasing it with expanded metal work upon which a coating of cement plaster is placed. This, if kept well painted with good lead paint, will prove a satisfactory way of protecting all strucfrying pan, thrown by some one who had more time than can be protected by sheet lead, or, if not in too close proximity to the cells, can be protected sufficiently by frequently cleaning and painting with an acid resisting paint such as Hydro Preservative paint. This paint is thick and heavy, and is said to be a strong, heavy, protective coating, and does not contain any coal tar to corrode the metal. It is claimed to be acid, gas and sulphur fumeproof. The battery rooms in all new electric sub-stations of the New York Central Railroad are painted ith this preservative paint.

One great danger of exposed iron work in a battery room, if it extends over the battery, is that the sulphate of iron formed by the action of the fumes may fall into the cells and impair the purity of the electrolyte, thereby seriously damaging the plates.

Legal Cases and Decisions

By A. H. McMillan

Getting Away from Free Service.

"We are at the present time burdened with free service over our county to those who pay $18 per year. We want to raise rates and get away from this. In looking over our franchises in the various towns in the county, which run from 15 years to perpetual, we find stipulated that the rate shall be $18 for residence and $24 for business, and this rate shall give the right to talk to any subscriber in the county or outside with which we have free exchange. Is it possible or plausible for us to get away from this clause? We have some rates of $5 and $6 per year, where people own their own lines, that we cannot make $18, and I expect we could hold the $5 and $6 rate to one town. But we want to make the $18 rate, $15 and only give the subscriber one exchange, and we also want to take the county right away from the $24 rates."

We do not know of any way in which you can get rid of the burdensome clauses in your franchises except by applying to the proper authorities, that is, the official bodies that granted your franchises in the first place, to have them amended. We suggest that you follow this course. The franchise as to rates is held to be a contract. Hence the only way out of it is to have the contract modified by the consent of both parties, that is the respective towns and your company. Mahan vs. Michigan Telephone Co., 132 Michigan 242; 93 Northwestern, 629.

Raising Rural Rates.

"We are thinking of raising our rural rates from $1.25 per month to $1.50 with a limitation that, if the rents are paid on or before the tenth of the month, beginning of the quarter, we will rebate the 25 cents per month. We are doing this in order to get our rentals paid, as we are having a great deal of trouble with our rural subscribers in getting them to pay their bills. We have contracts taken with these subscribers with a rate of $1.25 per month. Some of the contracts provide under the head of "Terms," 25 cents per month penalty if rents are not paid on or before the tenth of the month. The old contract has nothing of this kind in it.

I am enclosing copies of the two contracts. Will it be necessary for us to cancel all our contracts in order to put on this increased rate? What we wish to do in the matter is to render rural subscribers, quarterly bills for $4.50 instead of $3.75, as we do now. I want to get this ready and notify all rural subscribers of the advance and the discounts given, with our next quarterly statement, which will be sent out April first, or should I send out a notice of the increased rate in advance of the statement?"

The provision for a penalty under the head of "Terms" in the new contracts mentioned is as follows:

"The company, being bound to render to the subscriber efficient service, has the right to the advance payment of its rentals and, in case the advance payment is not paid when due, the subscriber here agrees to pay an additional charge of 25 cents each month to the company as compensation for the additional cost of collecting and handling the account."

It will, of course, be necessary for you to cancel and rewrite all of your old contracts. As to the new contracts, it will be necessary to do the same unless you wish to handle the matter with the subscribers having such new contracts in the following way, namely, wait until the second day of the quarter and then send out your bills for $4.50. The subscribers with whom you rewrite the old contracts can then be treated in the manner you propose. It might be better policy for you to rewrite all contracts and make new ones with every subscriber, thus placing them upon absolutely the same basis. It would be necessary for you to notify the subscriber of the increased rate in advance in order to get them to rewrite their contracts.

Condemnation Proceedings of Railroad Right of Way.

"After you have noted enclosed papers, will kindly advise whether you have any decisions on file of similar cases. You will note that we are on the right of way of the G. & S. I. R. R. Co. under condemnation proceedings for which we paid. We leased to the Postal Telegraph-Cable Co. the attachments to poles, which the railroad company claims we had no right to do. The railroad company leases all its wires from the Western Union Telegraph Co. Injunction proceedings were served one hour after line was completed on right of way, and the railroad company, before the court decision has been made, has cut the wires in some 1,200 different places. If you have any similar cases, kindly so advise with return of all papers, in what issue of TELEPHONY they appeared."

The question in substance which you ask is whether, after you have condemned a right of way upon a railroad right of way, you have the further right to lease your right of way to a telegraph company. Upon this question we have no similar decisions.

We are inclined to think that the reasoning of the situation may be against you on this ground. The right you acquire by condemnation proceedings was to use the railroad right of way from your telephone line. When you confer the same right upon the telegraph company, you theoretically increase the burden upon the railroad right of way and hence are taking more than you were given in the condemnation proceedings, and more than you were by them required to pay for.

Merging Two Telephone Companies.

"The following motion or resolution was introduced at our annual meeting and carried by 42⅔ for, to 16⅓ against making 59 shares voting, while there are 200 shares outstanding and all had notice of the meeting.

Resolution.—To the stockholders present at this annual meeting. I hereby move that the newly elected members of the board of directors for the coming year be authorized and empowered to merge our stock with the Farmers Telephone Co. provided they can and do make such arrangements as to their knowledge and belief would be for the betterment and welfare of the subscribers and stockholders of our company.

Now will the action of these few shares hold the others who were not there?"

The action of these few shares of stock will not bind others who were absent. The laws of Michigan require the consent of three-fourths of the stock of the company in order to authorize one telephone company to transfer its property to another corporation organized for similar purposes. Section 8572 of the compiled laws of 1897 provides that a corporation formed under any general law of that state may, at any special meeting of its stockholders with the consent of three-fourths of its capital stock, sell and convey all its property and franchises, rights and privileges, or any portion of its real property, or franchises to any other corporation formed under the same or any similar law for corporate purposes of the same character. See also cases of Telephone Co. vs. St. Joseph 121 Michigan, 509; Dieterle vs. Paint & Enamel Co., 143 Michigan, 421.

Franchises in Virginia.

"Please tell me how franchises are granted in cities of the first class in Virginia. I wish to know particularly whether a franchise is granted by the council in one evening or whether it has to be advertised for 30 days. Any other information bearing on this will be appreciated."

The question you ask can only be determined by consulting your city charter and the rules of the council or other legislative body of the city. These matters differ so in different localities of the same state that we cannot give you a definite answer.

Starting a New Rural Exchange.

"Where a telephone exchange is already in operation, can a number of farmers by petition, force or rather by compulsion enter the same town in Iowa, to maintain and operate a system of their own? The farmers are already subscribers of the present operating company but want a system of their own to avoid rental charge."

We know of no reason why a mutual rural telephone company cannot do business in a town in Iowa. Incorporated companies generally have the right to extend their

lines into the city streets under the state law. Chamberlain vs. Iowa Telephone Co., 119 Iowa 619; 93 Northwestern, 596.

We do not know of any reason why the same privilege does not extend to mutual companies.

By-Law Limiting Stock Sales.

"We are incorporated under the laws of Minnesota. All of our stock is common. The board of directors has adopted a by-law limiting the amount of stock sold to any one party to $500. *A*, holding $500 of stock, buys *B's* stock of $100. Can our company refuse to transfer *B's* stock to *A* for the reason that it would give *A* a greater amount of stock than allowed by the by-laws?"

The question of your right to refuse to allow the transfer of *B's* stock to *A* depends on the validity of the by-law limiting the amount of stock sold to any one party to $500. If the reason for the by-law is such as to make the by-law a reasonable regulation, you would have the right to refuse to allow the transfer, providing the by-law is so formed as to cover the case in question. If the language of the by-law simply limits the amount of stock sold by the company to any one party, to $500, it could not prevent one party from selling to another. The entire circumstances as well as the language of the by-law would have to be known in order to answer this question fully.

Switching a Farm Line.

"We are switching a farm line with individual contracts with the farmers, and in some cases they have signed no contracts. One party refuses to pay on the grounds that he does not call central and no one calls him through central. The farm line company owns the line to the corporation's limits. Can we cut this line off at the city limits and discontinue the service? What can we do to one on a farm line we switch if he refuses to pay his bill? Can we refuse him service if the company he belongs to upholds him?"

We think you have the right to cut this line off at the city limits and discontinue the service. As to the party on the farm line who refuses to pay his bill, we think you have the right to refuse service to the company he belongs to. In other words, you would hold the company for his indebtedness and refuse to switch the company unless he paid for his service.

Proving Permit to Climb Poles.

The laws of Kentucky provide that parties to suits may file as an exhibit any writing on which he intends to rely in evidence and that such writing may be read in evidence unless denied by affidavit before the trial. In an action against a telephone company an alleged written permit by it, authorizing linemen of another company to climb the poles of the issuing company, was not filed with or referred to in the pleadings.

The only testimony of the execution of the permit was that of two witnesses, one of whom testified that it was signed by an officer of the company, and the other that he believed it was signed by a foreman neither testified that he saw any person sign it, or that he recognized the signature as that of either of the persons mentioned. The written permit was held inadmissible. Beeler's Executrix vs. Cumberland Telephone & Telegraph Co., 150 Southwestern, 335.

Record of Telephone Patents Recently Issued

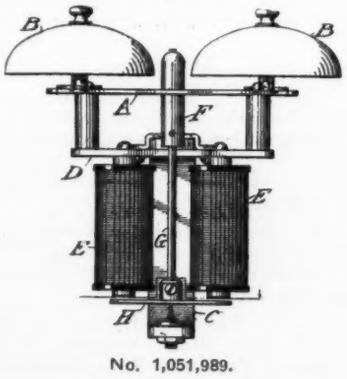
1,051,109. January 21, 1913. TELEPHONE SYSTEM; E. R. Hobbs, Buhl, Idaho. Describes a common battery, two-wire, multiple system which provides for the continuous energization of the cut-off relays at the exchange.

1,051,113. January 21, 1913. TELEPHONE; P. L. Jensen and E. S. Pridham, Napa, Calif; assigned to the Commercial Wireless & Development Co., San Francisco. Relates to telephone receiving apparatus having a flat coil included in the main line circuit, so mounted as to be subjected to a strong magnetic field.

1,051,148. January 21, 1913. SELECTIVE SIGNALING SYSTEM; J. McFell, Chicago. Selective ringing for common battery systems is described. Two polarized relays are installed at the subscribers' stations, and the signaling current is obtained from an electromagnetically controlled, clock-operated pole changer. The polarized relays are operated in conjunction with individual selectors.

1,051,228. January 21, 1913. ELAPSED TIME ELECTRIC SIGNAL; C. Hirdler, Oklahoma, Okla. Describes means for displaying a signal when the telephone has been used a certain period of time.

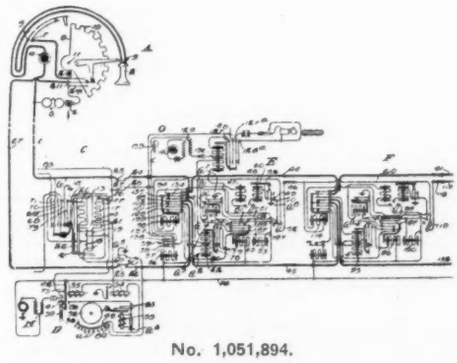
1,051,270 and 1,051,271. January 21, 1913. SELECTIVE SIGNALING SYSTEM. Describes selective signaling, sending and receiving apparatus of the step-by-step type.



No. 1,051,989.

1,051,894. February 4, 1913. SPECIAL CALL TELEPHONE SYSTEM; A. E. Keith, Hinsdale, Ill.; assigned to the Automatic Electric Co. Relates to a semi-automatic system with rotary calling devices. Mechanism under substation control is provided to extend the connection from calling lines to called lines and to disconnect the lines. A telephone or signal, common to all lines, is provided and so arranged as to be connected to the calling line, but disconnected before the call reaches the called line.

1,051,989. February 4, 1913. HARMONIC PARTY LINE RINGER; C. J. Erickson, Chicago; assigned to First Trust & Savings Bank. The ringer comprises a permanent magnet, a two-core electromagnet, a spring mounted armature adapted to be adjusted lengthwise of the spring, and a striker operated by the armature to vibrate between the two gongs.


No. 1,051,894.

1,052,162. February 4, 1913. SANITARY MOUTHPIECE; J. McCausland, Providence, R. I. A sanitary readily destructible cone is held in place on the transmitter by a U-shaped wire bracket in connection with a diaphragm protector.

1,052,443. February 4, 1913. RECEIVER HOLDER; Antoni Orzechowski, Stamford, Conn. Describes a receiver holder adapted for use on a desk stand.

1,052,989. February 11, 1913. RENT COLLECTING MEANS FOR TELEPHONE SERVICE; R. Yearneau, Clark, S. D. Relates to a box containing coin receiving compartments attached to the regular telephone set. Electric indicating contacts are made when coins are deposited so that amount is known to the operator.

1,053,048. February 11, 1913. SELECTIVE CALL SYSTEM; O. N. Lindsey, Senatobia, Miss.; assigned three-tenths to J. W. Hall. Describes a method for cutting off stations on a party line, except the one called, by means of special selectors.

Condensed News Reports

Officers of Companies are Earnestly Requested to Forward Us Promptly All Financial and Other Statements as Soon as Issued, and Any Items of Interest as to Their Plants and Systems

Personal.

MARGARET MACKIN HYATT, traffic supervisor of the Chicago Telephone Co., has been featured in the "Women Who Have Won" series, appearing simultaneously in the Chicago Daily News, the New York Tribune and papers in other large cities. The story of her successive rises in telephone operating work is graphically told from the time she entered the employ of the Chicago Telephone Co. as switchboard operator.

Margaret Mackin Hyatt.

She was promoted successively to supervisor, assistant chief operator, chief operator, and manager. Mrs. Hyatt says there was nothing remarkable in her advancement, promotion comcoming to her gradually, step by step. Upon being offered a new position, it never occurred to her to reject it because of the added responsibility and work. She was given charge of one of the largest telephone exchanges in Chicago, a position almost exclusively held by men. She held this position for several years and recently was promoted to the advisory position of traffic supervisor on the staff of the traffic superintendent. Although Mrs. Hyatt has been in business life for many years, she has preserved the charm of refined womanliness. She has successfully filled positions of authority and responsibility over many girls in Chicago. Her success did not affect her attitude toward those below and the universal sentiment among the forces is enthusiastic admiration and personal affection.

Incidentally it might be mentioned that the "Women Who Have Won" series is prepared by the McClure Newspaper Syndicate. In making selections for the articles but one woman in each of the various vocations is selected as representative of the successful ones.

New Companies.

NORFOLK, ARK.—The North Arkansas Mutual Telephone Co. has been incorporated with a capital stock of $5,000. The officers are: President, J. N. Ware; vice-president, J. Fix; secretary, T. H. Henley, and treasurer, S. J. Hutchinson.

PRAIRIE GROVE, ARK.—Articles of incorporation have been filed by the Farmers' Mutual Telephone Co., with $10,000 capital stock.

CLIFTON, COLO.—The Western Colorado Telephone Co. has been organized with $48,000 capital stock. The incorporators are: Frank Paxson, M. O. Douglas, and B. C. Oyler.

BUSHTON, KANS.—The Bushton Telephone Co. has been organized with $7,200 capital stock. The incorporators are: Henry Roelfe, Thomas Buss, Fred W. Roelfe, Albert Van Cleave, all of Bushton, and Henry Noelscher, of Chase, Kans.

OVERBROOK, KANS.—The Ridgeway Rural Telephone Co. has been organized with $1,000 capital stock.

OWINGSVILLE, KY.—The Bath Home Telephone Co., a consolidation of the Sharpsburg Home Telephone Co. and the Bath Home Telephone Co., has been incorporated with $60,000 capital stock. The incorporators are: Ben T. Wright, R. L. Sharp, M. V. Bostain and W. R. Wright

MECOSTA, MICH.—Articles of incorporation have been filed by the Blue Lake Independent Telephone Co. with $990 capital stock. The incorporators are: John Bell, Mecosta; John Smith, Rodney, Mich.; and A. A. Pangborn, Mecosta.

WAYLAND, MICH.—The Wayland Telephone Co. has been incorporated with $10,000 capital stock. The incorporators are: W. W. Weaver, F. C. Wing, and M. C. Williard.

WILSON, N. C.—The Rock Ridge Telephone Co. has filed articles of incorporations with $1,000 capital stock. The incorporators are: R. L. Barnes, R. A. Boyette and others.

BOONVILLE, N. Y.—The West Booneville Telephone Co. has been incorporated with $2,000 capital stock. The incorporators are Samuel Dorn, Perry Tabald, Newton Gleasman, G. H. Sasenbery, Clarence Safford, and Leslie Grimshaw, all of Boonville.

GREENVILLE, N. Y.—The Newry Rural Telephone Co. has been incorporated with $130 capital stock. The incorporators are M. J. Dennison, W. S. Lindsley, W. W. Applebee, M. P. Stevens, E. R. Palmer, L. E Terbush and Eugene Spaulding, all of Greenville

VERNON, N Y.—Articles of incorporation have been filed by the Vernon Telephone Co. with a capital stock of $10,000. J. E. Brewster, D. B. Case, J. D. Shipman, George Capes, F. H. Tygert, and Anna W. Tygert are the incorporators.

ELDORADO, OKLA.—The Rural Telephone Association has been incorporated with $3,000 capital stock. The incorporators are: President, W. H. Drew; vice-president, T. A. Robinson; and secretary, R. M. Spring, all of Eldorado.

TONASKET, WASH.—The Peoples Telephone & Power Co. has been organized with $15,000 capital stock. The incorporators are: J. H. Green, W. A. Neely, Harry Inman, Sam S. Rider and W. K. Halsey, all of Tonasket.

Construction.

AURORA, ILL.—The Interstate Telephone & Telegraph Co. will spend $500,000 for improvements, including the erection of a new exchange building at this city.

TAMPICO, ILL.—The Tampico Farmers Telephone Co. has voted to spend $3,000 in rebuilding and improving its line.

MEXICO CITY, MEX.—The Department of Communications is considering the construction of a telephone line to Orizaba and the city of Vera Cruz.

ATKINSON, N. C.—The Pender Telephone Co. will extend and improve its system.

WATERTOWN, S. D.—The Dakota Central Telephone Co. will erect a two-story modern exchange building. The company will also install the automatic system in this city next year.

DALLAS, TEXAS.—The Dallas Automatic Telephone Co. will make considerable extensions to its system.

RIO GRANDE, TEXAS.—The Pecos & Rio Grande Telephone Co. will construct a direct copper telephone system from Alpine to Marfa.

Elections.

BELVIDERE, ILL.—At the annual meeting of the Belvidere Telephone Co. the following officers were elected: President, J. R. Balliet; vice-president, George Grummon; secretary, F. S. Rowan, and treasurer, W. M. Marean. The following directors were elected: J. R. Balliet, F. S. Rowan, George Grummon, O. F. Lucas and Wm. M. Marean.

CUBA, ILL.—The Cuba Central Telephone Co. held its annual meeting recently and elected the following officers: President, O. R. Grady; secretary and treasurer, Nettie Nicholson, and director, George Murphy.

MT. STERLING, ILL.—The stockholders of the Mt. Sterling Telephone Co. held their annual meeting recently and elected the following officers: President, R. L. Davis; vice-president, J. R. Croning; treasurer, F. D. Meyer; secretary and manager, W. T. Purcell.

RIVERSIDE, IOWA.—The Uniondale Telephone Co. held its annual meeting recently and elected the following officers: President, Horace Steel; secretary, D. A. Fesler, and treasurer, Frank Critz. The following directors were elected: Horace Steel, I. C. Steel, D. A. Fesler, Frank Knotek, Frank Critz and George Grecian.